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ABSTRACTS OF CANNING TECHNOLOGY

Editor: W. D. Bigelow, *Director of Research Laboratory.*
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INTRODUCTION

The canning industry is fortunate in having several trade journals which publish current information relating to the canning industry. There are also many other journals that from time to time publish articles of more or less direct interest to the industry. These journals are not all available to any one reader and even if they were available, their number is so great that their examination would be a considerable task.

In the various departments of science, the multiplication of journals during recent years has led to the publication of abstract journals, which make it possible for any reader to see the titles of practically all the articles published on the subject in which he is interested as well as to read short abstracts of the great majority of those articles. It is thought that the literature relating to canning technology has now reached such a scope and is distributed among so many publications that an abstract journal will be a convenience.

This is the initial number of a publication which will be issued from time to time, in which an attempt will be made to give brief abstracts of articles appearing in various publications relating to the technology of canning. The task of preparing the abstracts is divided among something more than 50 men who are connected with the canning and can making industries, and several university and Government laboratories. Each of these men assumes the responsibility of reading certain journals regularly and reporting the titles or short abstracts of articles that come within this scope. The amount of work imposed on any one abstractor will therefore not be great. The abstracts thus prepared are assembled and edited by the Research Laboratory of the National Canners Association.

This initial number consists of articles published in 1922. Owing to a misunderstanding connected with the organization of the work, many such articles were overlooked which will be included in subsequent numbers. It will be noted that the great majority of the articles in this number are merely mentioned by title. In the succeeding numbers more adequate abstracts will be given.

It is planned that the journal will be issued quarterly and that the last number of each year shall contain an index. This will perhaps be the most useful feature of the publication, as it will tend to make permanent much valuable information which is now lost soon after its publication.

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ABSTRACTS OF CANNING TECHNOLOGY

FACTORY CONSTRUCTION AND EQUIPMENT.

(*See also numbers 101, 178, 188, 194, 196, 241, 245, 288, 290*)

1. **The steel belt in material handling.** Harry Carlson. *Chem. Age.* (*N. Y.*) 30, 419-420 (1922).

2. **The factory.** B. R. Hart. *The Trade*, Feb. 6, pp. 35-6 (1922).—A discussion of the arrangement of equipment and the operation of a factory with a view to economy and sanitation. The discussion refers especially to tomato canning factories. C. O. Ball

3. **The Hawaiian pineapple cannery.** C. P. Baxter. *Canning Age*, June, p. 5 (1922).—Illustrated description of plant and process.

4. **Care of canning equipment during the idle season.** Evan Reicheldorfer. *Canner*, Dec. 16, p. 27 (1922).

5. **Considerations in selecting equipment.** Max Donauer. *Canning Age*, Apr., p. 29 (1922).—Discussion of advantages in using enameled equipment.

6. **A continuous pressure cooker and cooler.** *Canning Age*, Mar., p. 30 (1922).—Description of machine.

7. **The margin of profit in variety packing.** *Canning Age*, Mar., p. 5 (1922).—Illustrated description of plant of Libbey, McNeill & Libbey, Blue Island, Ill.

8. **An ideal in cannery construction.** *Canning Age*, Jan., p. 5 (1922).—Illustrated description of plant of Dixie Fruit Products Co., Mobile, Ala.

9. **Engineering for canners.** *Canner*, Nov. 4, p. 25 (1922).

10. **A new apricot pitting machine.** *Canning Age*, June, p. 38 (1922).

11. **Modern can-conveying systems.** H. O. Berryman. *Canner*, Apr. 15, p. 27 (1922).

12. **Weighing machine that detects shorts and overfills.** *Canning Age*, May, p. 42. (1922).

13. **Gage pressures.** E. F. Mueller. *Am. Soc. Refrig. Eng. J.* 8, 225-30 (1921), through *C. A.* 16, 1118.—The relation between gage pressure (pressure above that of atmosphere) and pressure in a closed system is not a constant but a variable depending upon the altitude. Properties of refrigerating mediums in terms of gage pressures are, therefore, of little value. The possible advantage of the use of gages which shall indicate the total pressure in several parts of a closed system is discussed. G. E. Holm

14. **Temperature equipment in the canning industry.** S. H. Lindsley. *Canner*, June 10, p. 27 (1922).

15. **A new temperature control instrument.** *Canning Age*, May, p. 38 (1922).

16. **First aid for the cannery thermometer.** Leon S. Lyons. *Canning Age*, May, p. 20 (1922).—Testing and care of cannery thermometers.

17. **Advantages of vacuum drying of food.** J. Doughton. *Am. Food J.*, Apr., p. 25 (1922).—A description of three forms of vacuum dryers—shelf, drum and rotary.

18. Dehydration developments in California. A. W. CHRISTIE. *Am. Food J.*, Jan., p. 17 (1922).—A review of investigations at the University of California. The air-blast tunnel dehydrator was proved to be superior to all other types tried.

19. Factors of dehydrator efficiency. W. C. CRUESS AND A. W. CHRISTIE. *Better Fruit*, Aug., pp. 9-10 (1922).—The principles of dehydration and comparative costs of different kinds of dehydrators. E. H. WIEGAND

20. Emergency drier of raisins introduced as relief measure. H. W. WRIGHTSON. *The Evaporator* 14, No. 11, 10-11 (1922).

21. Machine of new design for automatic cartoning of bottles. *Am. Food J.*, June, p. 29 (1922).—The machine feeds flat cartons from the bottom of a pile, opens the carton without insertion of a blade, feeds a bottle into the carton from the conveyor and closes and seals both ends of the carton.

22. Bottle filling machine. *Am. Food J.*, June, p. 29 (1922).—Description of a machine for filling round bottles of any size from 1 oz. to those 3¼ inches in diameter, also for panel and square bottles up to a width of 3¼ inches.

23. Schedule for nailing boxes. NATIONAL ASSOCIATION OF BOX MANUFACTURERS. *The Trade Almanac*, p. 107 (1922).

24. Steam circulation and drainage. R. C. GAMMON. *Canning Age*, June, p. 36 (1922).

25. Use of filter-cel for industrial filtration processes. G. M. HICKEY. *J. Ind. Eng. Chem.* 13, 990-2 (1921), *C. A.* 16, 130.

26. Industrial filter media. ARTHUR WRIGHT. *J. Ind. Eng. Chem.* 13, 984-6 (1921), *C. A.* 16, 131.

27. Leaf and rotary suction filters. G. D. DICKEY. *J. Ind. Eng. Chem.* 13, 997-9 (1921), *C. A.* 16, 1.—A description and discussion of uses.

29. Modern leaf type filters. ROBERT C. CAMPBELL, *J. Ind. Eng. Chem.* 13, 1002-4 (1921), *C. A.* 16, 1.—A description and discussion of uses.

30. Pulp or filter mass filters. E. F. FINCH. *J. Ind. Eng. Chem.* 13, 996-7 (1921), *C. A.* 16, 1.—A description and discussion of uses.

31. Vallez rotary filter. H. A. VALLEZ. *J. Ind. Eng. Chem.* 13, 1007 (1921), *C. A.* 16, 1.—A description and discussion of uses.

32. Oliver continuous filters. H. A. MORRISON. *J. Ind. Eng. Chem.* 13, 1005-6 (1921), *C. A.* 16, 1.—A description and discussion of uses.

33. Centrifugal filters. H. C. BECKMAN. *J. Ind. Eng. Chem.* 13, 992-3 (1921), *C. A.* 16, 1.—A description and discussion of uses.

34. Atkins-Shriver automatic filter press. H. D. ATKINS. *J. Ind. Eng. Chem.* 13, 1006-7 (1921), *C. A.* 16, 2.—A description and discussion of uses.

35. Plate and frame filter presses. E. C. ALFORD. *J. Ind. Eng. Chem.* 13, 1001-1 (1921), *C. A.* 16, 2.—A description and discussion of uses.

SANITATION, WASTE DISPOSAL AND WATER SUPPLY

(See also numbers 2, 114, 212, 218, and 248)

36. Sanitation of fruit and vegetable canneries. HARRY M. MILLER. *Am. J. Pub. Health* 11, 922-23 (1921), through *C. A.* 16, 762.—M. describes various steps in the preparation of canned peaches, peas, etc. NATHAN VAN PATTEN

37. Sanitary control in the manufacture of foods and its economic importance. GEORGE GRINDROD. *Am. J. Pub. Health* 11, 920-2 (1921).—A resume.

38. Treatment of canning factory drainage. JOHN C. DIGGS. *Trade*, Nov. 25, p. 33 (1922); *Canner*, Nov. 25, p. 33 (1922).

39. Treatment and disposal of fruit and vegetable cannery wastes. R. F. GONDEY. *Canner*, Aug. 19, p. 27(1922).

40. Physical examination of food handlers. L. B. GLOZNE. *J. Am. Med. Assoc.* 78, 1455(1922).—Good results have been secured by municipal ordinance, especially in restaurants. H. M. LOOMIS

41. Purifying tomato-canning wastes. U. S. PUBLIC HEALTH SERVICE. *Public Works* 52, 191(1922).

42. The disposal of cannery wastes. *Canning Age*, Oct., p. 15(1922).

43. Commercial utilization of waste seed from the tomato-pulping industry. J. H. SHRADER AND FRANK RABAK. *Bur. Plant Ind., Bull. 927*, 1-29 pp. (1921); cf. *C. A.* 12, 538, through *C. A.* 16, 447.—By application of proper methods the seeds in the waste from the pulping of tomatoes may be separated and made to yield oil and press cake or meal of considerable commercial value, the former as a table or culinary oil and the latter as stock feed. Detailed directions are given for extracting, refining and deodorizing the oil, and an estimate is made of the possible returns and net profits to be derived from the oil, cake and meal. W. H. ROSS

44. Industrial value of the waste from tomato-canning factories. S. FACHINI. *Boll. assoc. ital. Pro Painte medicinali, aromatiche altre utili* 4, No. 1, 11-13(1921); *Bull. Agr. Intelligence* 12, 486-7, *C. A.* 16, 3985.—A discussion of the methods used in Italy on the utilization of tomato waste.

45. More profits from pits. H. R. SCOTT. *Sunsweet Standard*, Dec. 6, No. 7, p. 17, (1922).—A discussion of the methods of utilizing apricot pit kernels in the manufacture of the following by-products by the California Prune and Apricot Growers' Association: fixed oil for use in drugs, cosmetics, soaps, insecticides and as an edible oil; oil of bitter almonds for drugs, cosmetics and flavorings; kernel meal for cosmetics; macaroon paste for cakes and confections; and stock food. ARTHUR W. CHRISTIE

46. Vegetable oils may be obtained from wastes. *Am. Food J.*, Aug., p. 13 (1922).—A discussion of the utilization of sunflower, tomato and other seeds as a source of edible oils.

47. The romance of waste reduction. *Canning Age*, Apr., p. 13(1922).—Description of salvage from fruit pits, syrup waste, fish scrap.

48. Tastes and odors from chlorination of water. W. A. SPERRY AND L. C. BILLINGS. *J. Am. Water Works Assoc.* 8, 603-15(1921); See *C. A.* 15, 3163, *C. A.* 16, 454.

49. Probable formation of phenolic compounds by a chlorinated water in contact with a coal tar paint. C. A. HECHMER. *J. Am. Water Works Assoc.* 9, 319-22(1922), through *C. A.* 16, 1475.—A 100,000 gallon steel tank was cleaned, painted, and put in service before the coal tar paint dried. Liquid chlorine 0.4 parts per million was used with the water and on entering the tank 1 part per million of bleaching powder was added. An odor of iodoform and taste of carbolic acid soon appeared in the tap water. A positive test for phenols was obtained. D. K. F.

50. Effect of gas plant wastes on taste and odor of water. C. A. EMERSON, JR. AND C. M. BAKER. *Proc. Am. Soc. Civil Eng.*, Dec. 1921, Jan. 1922, *Eng. Contr.* 57, 132-3(1922), through *C. A.* 16, 2000.—E. states that the wastes from by-product coke ovens and gas works impart a characteristic taste to water, which is accentuated by application of chlorine. Sometimes dilutions as great as several million parts of chlorinated water fail to remove the taste. The remedy is to evaporate the wastes in the works, by use as quench water on coke. Aeration of water contaminated by gas wastes is helpful. Remedy at works is to install settling and skimming basins, and use the effluent in scrubbers. In some cases the effluent can be filtered through sand (rate 400,000 gal. per acre per 24 hours) and used for boilers. B. describes Milwaukee experience in 1918, where coal-tar derivatives were objectionable. Phenol was detected by taste in dilution of 1 to 500,000,000. Closing of a phenol plant temporarily remedied the condition. Later tastes were traced to intermittent discharge of gas wastes. By making discharge continuous conditions were remedied. LANGDON PEARSE

51. **River pollution from milk depots.** W. G. SAVAGE AND D. R. WOOD. *J. State Med.* 30, 307-316 (1922).—It is an economic blunder to discharge whey into a stream. F. W. TANNER

52. **Soft water reduces canning costs and improves quality.** *Canner*, July 1, p. 31 (1922).

FRUITS AND FRUIT PRODUCTS

(*See also numbers 3, 10, 20, 36, 45, 275, 276, 283, 304 and 307*)

53. **Making and preserving unfermented apple juice.** *Trade*, July 24, pp. 20-4 (1922).—A brief review is given of Farmers' Bull. 1264 (U. S. Dept. Agr.) "Farm manufacture of unfermented apple juice," by Joseph S. Caldwell.
C. O. BALL

54. **Progressive disappearance of free sulphurous acid in preserved apple juice.** WARCOLLIER AND LEMOAL. *Compt. rend.* 174, 634-7 (1922); *Analyst* 47, 212 (1922).—Free sulphurous introduced into apple juices as an antiseptic, is transformed on long standing into the combined state with consequent loss of antiseptic properties. Constituents of normal apple juice yield comparatively little combined sulphurous acid. Results of experiments indicate that such combination is effected by the agency of compounds, probably aldehydic or ketonic in character, produced by the action of the oxidases of the moulds on the sugars and pectic substances, and possibly on the glycerol.
F. J. DASHNER

55. **Canning sweet cider.** E. H. WIEGAND. *Am. Fruit Grower*, Oct., pp. 7-26 (1922).—The following points are discussed: desirable varieties of apples, necessary equipment, clarification of cider, and processing the products.

56. **Cider preservatives.** R. D. SCOTT AND E. G. WILL. *J. Ind. Eng. Chem.* 13, 1141-43 (1921); through *J. Soc. Chem. Ind.* 41, 153A (1922).—Fermentations inhibited by addition of 0.2% salicylic acid or 0.1% of thymol. Addition of .05% of sodium benzoate or of 0.1% salicylic acid might be of some use in preserving cider commercially. Smaller amounts are ineffective.
D. V. ALBERTS

(The use of salicylic acid as a preservative is prohibited by Federal regulations.—*Editor.*)

57. **On the preservation of cider.** *Canner*, Nov. 18, p. 56 (1922).—Use of chemical preservatives to prevent alcoholic fermentation described.

58. **Cider and its preservation.** F. E. RICE AND A. L. MARKLEY. *N. Y. Agr. Coll.* (Cornell) *Expt. Bull.* 44, 23 pp. (1921); *Expt. Sta. Record* 46, 207-8, through *C. A.* 16, 3141.—A discussion of the chemical composition and food value of apple cider, and the most practical methods for its preparation, clarification, preservation, and concentration.

59. **Best canning berries.** J. O. HOLT. *Canner*, July 29, p. 30 (1922).

60. **What are merchantable cherries?** W. C. GAEGLEY. *Canner*, Dec. 23, p. 32(1922).

61. **Dehydrated cherries.** ARTHUR W. CHRISTIE. *The Evaporator* 14, No. 6, 3-5(1922).

62. **Great improvements in U. S. fig industry.** IRA J. CONDIT. *Am. Food J.*, Mar., p. 7(1922).—A review of the industry as developed in California.

63. **Marmalade juice and jelly juice from citrus fruits.** W. V. CRUESS AND LAL SINGH. Circular 243 *Univ. Calif. Expt. Sta.*, June, 1922.—Describes process of preparing canned juice and juice with peel for use of the housewife and jelly maker. The juice is prepared by boiling equal weights of sliced oranges and lemons with water; pressing, settling; filtering and concentrating to 10-12° Balling. Sliced boiled peel (10-15%) may or may not be added as desired. The product is canned boiling hot and sealed; or is canned, exhausted, sealed and processed at 212° F. for ten minutes. In using the product two parts of sugar is added to one part of juice and the mixture boiled two minutes. Jelly or marmalade forms on cooling. W. V. CRUESS

64. **Experiments in the manufacture of fruit butters.** J. H. FISH. *Canner*, Jan. 21, p. 47(1922).—Tomato canning machinery is satisfactory for fruit butters. The best prune butter is made from early fruit. The fruit is pulped by heating with water in aluminum kettles, and is screened to remove seeds. Butter from mature fruit is improved by the addition of grape juice. The formula, yield and costs are given. Pear butter is made by the addition of sugar, cloves, lemon juice, cinnamon and ginger to pear pulp. Manipulation of formula and process as well as yield and costs are given. Butter made from dried pears had strong sulfur flavor. B. S. CLARK

65. **Some helps in the manufacturing of jams.** C. H. CAMPBELL. *Canner*, Aug. 12, p. 41(1922). B. S. CLARK

66. **Art of making jams, jellies and marmalade of fruits.** E. MONTI. U. S. P. 1398 339, *J. Soc. Chem. Ind.* 41, 30A(1922).

67. **Practical experiments in jelly making.** LAL SINGH. *Canning Age*, Aug. p. 11(1922).

68. **Important discoveries in jelly making.** LAL SINGH. *Canning Age*, July, p. 5(1922).—Experiments on the effect of varying amounts of acid upon the jelling point, relation of acidity to sugar and pectin to sugar.

69. **Use of enzymes in the clarification of jellies and fruit juices.** S. A. WAKSMAN. *Canner*, Apr. 29, p. 45(1922).—Enzyme obtained from growth of aspergillus aryzae fungus may be used to clarify jellies and fruit juices. Process given. B. S. CLARK

70. **The jelly won't jell.** ANN PROCTOR. *American Grocer*, July 12, p. 8 (1922).—A description of the use of commercial pectin; several recipes for jelly and jam are also given.

71. **Compounding of fruit syrups for carbonated beverages.** J. WM. WELLS. *Pacific Bottler*, Oct., pp. 17-18, 32-3, 44-5(1922).—The constituents of fruit juices are given, also their manufacture, clarification and preservation. E. H. WIEGAND

72. **Carbonated grape beverage.** W. V. CRUESS. *The Associated Grower* 4, No. 3, 22(1922).

73. **Physiological study of ripening and storage of grapefruit.** H. A. HAWKINS. *J. Agr. Res.* 22, 263-278(1921); *J. Soc. Chem. Ind.* 41, 29A-30A(1922).—Acidity increased during warm storage, decreased during cold storage. No

effect on the total sugars—sugars increased, acid decreased with fruit on tree. Pitting can be controlled by curing at 70°C. prior to cold storage.

D. V. ALBERTS

74 **Influence of temperature of sterilization and fermentation of fruit juices on the flavor of the product.** *Am. Vinegar Ind.*, Jan., p. 6 (1923).—Experiments carried out in France on grape juice have shown again that the temperatures of sterilization and fermentation have marked influence on the bouquet of the wines produced. If the temperature of sterilization is too high, certain compounds of agreeable fruity taste and aroma are destroyed; if the temperature of fermentation is too high the rapidly escaping carbon dioxide carries with it delicately flavored volatile substances which fill the fermenting room with an aroma that should remain in the juice. This latter fact is sometimes taken advantage of to give to sterilized, unfermented fruit juice, a rich bouquet usually met only with wines. This is done by leading gas from an actively fermenting cask of juice into a cask of sterile juice. After a time the unfermented juice will have acquired a delicious bouquet which is much prized by those who like to drink "fruit juice without alcohol." For this reason Rosenthiel recommends that fruit juices be heated not above 122°F. and fermented below 68° F. Fruit juices heated only to 122° F. are not sterile but the bacteria and fungi which they contain are so weakened that they are powerless to interfere with the work of culture yeast. E. H. WIEGAND

75. **The ripe olive in California.** W. V. CRUESS. *Canning Age*, Sept., p. 5; Oct., p. 17 (1922).

76. **Method for pickling manzanillo olives.** W. V. CRUESS. *Canner*, Nov. 11, p. 39 (1922).

77. **Some factors affecting the quality of ripe olives sterilized at high temperatures.** W. V. CRUESS. *Calif. Agr. Exp. Sta., Berkeley. Bull. 333*, 221-231 (1921), through *Abstracts Bact.* 6, 63 (1922).—Results of investigations carried out to determine the effect of high temperature on the quality of olives show that properly pickled olives yield an acceptable product when sterilized at 240° F. for 40 minutes. Overripe olives and olives of certain varieties are subject to injury at this temperature while certain precautions in regard to the handling of the olives were found to be useful in preventing or lessening injury. The scorched flavor noted in most olives immediately after sterilization at 240° F. rapidly diminishes during storage. J. R. ESTY.

78. **An outline of olive pickling.** W. V. CRUESS. *Cal. Fruitman*, June, pp. 11, 22, 24 (1922).—Description of standard "exposure" process in commercial use in California. Advises careful study and experiment before undertaking commercial pickling. University investigations prove thorough lye treatment is necessary to remove all bitterness before canning, in order to avoid development of "burnt" taste in the can. W. V. CRUESS.

79. **Directions for processing ripe olives.** W. V. CRUESS. *Canner*, Apr. 15, p. 41 (1922).

80. **California olives are sterilized at 240° F. for 40 minutes.** *American Grocer*, Apr. 12, p. 15 (1922).

81. **Methods used in manufacturing unfermented grape juice.** C. H. CAMPBELL. *Canner* 51, No. 9, 35, 36; No. 10, 35, 36 (1920); *Expt. Sta. Record* 45, 210, through *C. A.* 16, 3141.—A brief description is given of the various steps in the process of manufacturing Concord grape juice, together with analyses of juices from Concord, Ives, and Clinton grapes, of argol and of grape pumace. H. G.

82. **Pears successfully dehydrated in northwest.** E. H. WIEGAND AND RAY POWERS. *Am. Food J.*, Jan., p. 19(1922).

83. **New test for maturity of pears.** *Canner*, Feb. 18, p. 36(1922).—Review of Bulletin of Exp. Station of Oregon Agr. College by A. E. Murmeek regarding instrument for machanically testing maturity of pears.

B. S. CLARK

84. **Peach drying.** L. C. BARNARD. *The Associated Grower* 4, No. 2, 28-9 (1922).

85. **Fuzzless dried peach methods perfected.** I. J. CONDIT. *The Evaporator* 14, No. 5, 8-10(1922).

86. **The odorous constituents of peaches.** FREDERICK B. POWER AND VICTOR K. CHESNUT. *J. Am. Chem. Soc.* 43, 1725-39(1921), *C. A.* 16, 53(1923).—Isolation and identification of odorous constituents is described.

87. **Hawaiian pineapple canning makes great strides.** *Canner*, Sept. 2, p. 33(1922).—Gives number of cases packed each year 1901-1921 inclusive.

B. S. CLARK

88. **Hawaiian pineapple canning industry's progress.** W. D. HORNADAY. *Canner*, May 6, p. 27(1922).

89. **Paper mulch for pineapples.** A. T. LONGLEY. *Trade*, May 15, p. 28 (1922).

90. **How Hawaiian pineapple is grown and packed.** S. T. HOYT. *Canner*, July 1, p. 27(1922).

91. **Manufacturing syrup from very small and seconds dried prunes.** *Canner*, May 13, p. 49(1922); *Chem. Age (N. Y.)* 30, 230(1922).—Abstract of process developed by E. J. Helgren, Santa Rosa, Cal. B. S. CLARK

92. **Use of pectin in jams and jellies.** H. S. PAINE. *Am. Food J.*, Mar., p. 11(1922).—A review of a study of the effect of varying proportions of pectin, sugar and acid on the consistency of jellies, and to some extent, jams.

93. **Changes which occur in the pectic constituents of stored fruit.** M. H. CAIRE. *Biochem J.* 16, 704-712(1922); *J. Soc. Chem. Ind.* 41, 993A(1922).

94. **Study of the relation of pectin and acidity in jelly making.** L. SINGH. *J. Ind. Eng. Chem.* 14, 710-711(1922); *J. Soc. Chem. Ind.* 41, 726A(1922).

95. **Estimation of pectin as calcium pectate and the application of this method to the determination of the soluble pectin in apples.** M. H. CAIRE AND DOROTHY HAYNES. *Biochem J.* 16, 60-69(1922).

96. **Behavior of pectin towards alkalies and pectase.** FRANK TUTIN. *Univ. Bristol. Biochem J.* 15, 494-97(1921), *C. A.* 16, 65.

97. **Domestic exports of canned cherries, peaches, pears and pineapples from the United States by countries as compiled by the Dept. of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.** *American Grocer*, Sept. 13, p. 23(1922).

98. **Labeling of fruit salad.** *American Grocer*, May 3, p. 14(1922).—A letter by W. G. Campbell, acting Chief Bureau of Chem., U. S. Dept. Agr.

99. **Factors in manufacturing fruit products.** LAL SINGH. *Canning Age*, June, p. 17(1922).—Description of manufacture and use of pectin.

100. **A means to greater profit.** *Canning Age*, May, p. 35(1922).—Southern California standards and specifications for peaches and apricots.

101. **Use of vacuum pan for fruits products.** F. F. BRAMAN. *Am. Food J.*, Sept., p. 9(1922); *Canner*, Sept. 16, p. 23(1922).—A discussion of the advantages in using glass enameled vacuum pans in the manufacture of fruit products.

102. The cold-storage of fruit. A. Monvoisin. *Rev. gen. froid. ind. frigorifigures* 2, No. 3, 80-5(1921); *Bull. Agr. Intelligence* 12, 1036-45, through *C. A.* 16, 4287.—The changes observed during preservation are due to evaporation, physiological processes or supervening bacterial action. They are either physical, chemical or bacterial. The chemical changes are the alterations occurring during the normal process of ripening, with the sole difference that their rapidity is considerably lessened. This is clearly shown by comparing the following results obtained by Bigelow with the Ben Davis apple, which was preserved for 133 days at 0° and also at ordinary temperature. The figures give percentages at the beginning, after 133 days storage at ordinary temperature, and after the same period at 0° C. Total dry matter 15.40, 13.02, 14.21; acidity expressed as malic acid 0.63, 0.33, 0.50; sucrose 3.83, 0.90, 2.25; total sugars (in invert sugar) 10.17, 8.57, 9.46. The loss in weight is more noticeable at ordinary temperature than at 0°. The combustion of the acids, although perceptible, is less pronounced at 0° than at ordinary temperature; the same may be said respecting the combustion of sugars. The results obtained with other fruits such as peaches, plums, etc., are very similar to those observed in the case of apples. H. G.

103. Springers and perforations in canned fruits. W. D. Bigelow. *Research Laboratory, National Canners Assoc., Circ. 1-L*, Jan., 1922.—The subject is treated under the following heads: kind and character of tin plate; fill of cans, preheating and exhaust; efficiency of closure; temperature to which canned product is exposed. Especial attention is given to the importance of correct technological procedure in the packing of fruits and to the influence of temperature and storage on the formation of springers and perforations.

104. Pinholing of fruit cans. W. D. Bigelow. *Trade*, Feb. 6, pp. 54-5 (1922).—Progress in the study of perforations has been very slow. Three factors are known to cause reduced liability to perforate. These are heavy tin coating, efficient exhaust and good closure. C. O. Ball

105. Pinholing. F. F. Fitzgerald. *Canner*, Feb. 25, part 2, p. 139(1922).—Good exhaust and perfect closure of cans reduce pinholing. B. S. Clark

106. Perforation of red fruits packed in enamel-lined tins. Wm. McEwing. *Canner*, May 13, p. 27(1922).—Review of causes of perforations and recommendations regarding exhaust, can specifications, etc., to reduce development of perforations. B. S. Clark

107. Cold storage improves fruit flavors. *Canner*, June 10, p. 45,(1922).

108. Preservers, research problems. A. W. Bitting. *Canner*, Feb. 25, part 2, p. 201(1922).

109. Scientific preserving and research work. H. S. Paine. *Canner*, Feb. 25, part 2, p. 200(1922).

110. Balling scale. *The Trade Almanac*, p. 81(1922).—A short table of conversion from degrees Balling and degrees Baume. C. O. Ball

111. Dehydrated products in commerce and in the sciences. Louis Gershenfeld. *J. Am. Pharm. Assoc.* 11, 86-90(1922); *Botan. Abstracts* 11, 720 (1922).

112. Dehydration of fruits (A progress report). W. V. Cruess and A. W. Christie. *Calif. Agr. Expt. Station. Bull.* 330, 50-77(1921); *Botan. Abstracts* 10, 178(1922).

113. Sun-drying versus dehydration. A preliminary report. P. F. Nichols.

Monthly Bulletin Dept. of Agr. Calif. 10, 191-8(1921); *Botan. Abstracts* 11, 596(1922).

VEGETABLES

(*See also numbers 36, 41, 43, 44, 226, 285, and 353*)

114. **Salvaging asparagus waste.** H. D. Morgan. *Am. Food J.*, Nov., p. 30 (1922).—There is great waste in the inedible part of the stalks. An extract could be made from these stalks, part of which could be used for medicinal preparations, and part of which could be marketed under a suitable trade name as a seasoning for soups, stews, gravies, etc. The exhausted pulp could be used for the production of a fine white tissue paper. J. P. Street

115. **Green lima beans.** *U. S. Dept. Agr., Bureau Chem., Service and Regulatory Announcements*, Chem. 28, item 386.—In the labeling of canned lima beans the term "green lima beans" should be reserved for fresh beans that are green in color. This term indicates not only the maturity the vegetable has attained but also its color. It should not be used if an appreciable quantity of white beans is present, even though the white beans be immature.

116. **Bean canning practices.** B. R. Hart. *Canner*, Feb. 25, part 2, p. 132 (1922); *Canning Age*, Feb., p. 25(1922).—Address covering proper practice of washing, brining and processing string beans. Time and temperature of process satisfactory for each size of can are given. B. S. Clark

117. **Labeling fresh lima beans.** W. G. Campbell. *Trade*, Apr. 24, p. 26 (1922).—The Bureau of Chemistry brands the use of the designation "green lima beans" as improper for a product containing an appreciable number of white beans. C. O. Ball

118. **Labeling soaked dry peas and lima beans.** *U. S. Dept. Agr., Bureau Chem., Service and Regulatory Announcements*, Chem. 28, item 389.—It has been found that the wording employed on canned soaked dry peas has frequently created the impression that the peas were canned in the succulent state and that this impression has been furthered by the pictorial designs employed, such as a vignette showing a dish of green-colored, succulent-appearing peas. This product should be labeled "soaked dry peas," or with an equivalent expression, in type of equal size, on a uniform background, in order to differentiate it clearly from succulent peas. No pictorial design which would contribute to the impression that the product is canned succulent peas should be employed. Opinion 18, page 111, Service and Regulatory Announcements, Chemistry 3, and opinion 42, page 313, Service and Regulatory Announcements, Chemistry 5, are amended accordingly.

This announcement is equally applicable to the labeling of canned soaked dry lima beans.

119. **Promising development of soya bean sauce.** K. Oskima. *Am. Food J.*, Jan., p. 30(1922).—A study of a process for "ripening" the product, in particular the protease of *Aspergillus oryzaeflavus.*

120. **Moisture in beans.** J. W. McCall. *Canner*, Feb. 25, part 2, p. 128 (1922).—Discusses variation in moisture content of beans purchased by canners and effect of this variation on the profits of bean canning. B. S. Clark

121. **Snipper that marks a new era in bean canning.** *Canner*, Aug. 26, p. 27(1922).

122. **The effect of cooking upon the antiscorbutic vitamin in cabbage.** W. H. Eddy, E. Shelow, and R. A. Pease. *Proc. Soc. Exp. Biol. Med.* 19, 155-60(1922); through *Botan. Abstracts* 11, 681(1922).—When cabbage was

cooked by either the pressure cooker or the open kettle method, vitamin C was destroyed, as shown by experiments on guinea pigs. The animals were not protected against scurvy by cooked cabbage.

123. **The measurement of maturity of country gentleman corn.** L. V. BURTON. *Trade*, May 1, pp. 22-3(1922).—An address delivered at the convention of the Western Canners Association, April 14, 1922.

124. **The sterilization of corn.** W. D. BIGELOW. *Trade*, Feb. 6, pp. 73-4 (1922).—The factors discussed are influence of cleanliness and promptness in canning, initial temperature, time of heating retort to temperature, method of cooling, and time and temperature of process. Sterilizing processes are given both for thermophilic organisms and those which grow at other temperatures. C. O. BALL

125. **Black discoloration in canned corn.** F. F. FITZGERALD, G. S. BOHART, AND E. F. KOHMAN. *Research Laboratory, National Canners Association, Bul. No. 18-L, Canner*, Feb. 11, p. 30(1922).—Summarizes progress of experimental work to eliminate black from canned corn. B. S. CLARK

126. **A can of corn.** W. H. HARRISON. *Trade*, Feb. 6, pp. 71-2(1922).—A discussion of the capacity, organization, and equipment of a factory as it should be to produce high quality corn.

127. **The sterilization of corn and tomatoes.** W. D. BIGELOW. *Trade*, Jan. 2, pp. 8-14(1922).—Four factors of importance are emphasized, (1) initial temperature, (2) accuracy of control of retort temperature, (3) time used in bringing retort to processing temperature, and (4) efficiency of cooling. Suggested processes sufficient to destroy practically all thermophilic spores in corn are: No. 1 cans, 50 minutes; No. 2 cans, 80 minutes, and No. 10 cans, 190 minutes, all at 250°—initial temperature to be not less than 180°. It is thought that in tomatoes, all spoilage is due to nonspore-bearing bacteria. Processes are suggested for tomatoes, for both open bath and agitated cooking. These are tentative, however, for not much work has yet been done to determine the proper processes for tomatoes. C. O. BALL

128. **"Maine style" canned corn.** *U. S. Dept. Agr., Bureau Chem., Service and Regulatory Announcements*, Chem. 28, item 387.—The term "Maine style" has been used for a number of years on the labels of canned corn packed in certain sections as a means of distinguishing the crushed grain from the whole or cut grain type. Complaints that this expression when used on canned corn packed in States other than Maine is misleading led to investigations in several consuming sections which showed that so-called Maine-style corn is furnished by dealers in many localities when request is made for Maine corn, and that in such sections the expression is interpreted as having a geographical significance. Canned corn packed outside the State of Maine and labeled "Maine style" will therefore be regarded as misbranded under the Federal Food and Drugs Act. There will be no objection to the use of any truthful descriptive statement intended to designate the character of the pack.

129. **Dehydration of sweet corn successful.** W. A. NOEL. *Am. Food J.*, Apr. p. 7(1922).—The industry is a success and dehydrated sweet corn is twice as profitable to the manufacturer as canned corn and costs the housewife only one-half as much. However, it is not to be compared with canned corn, being an entirely different product and resembling in flavor corn roasted on the cob. J. P. STREET

130. Sorting and trimming corn. Orin Crooker. *Canning Age*, Nov., p. 5 (1922).

131. The discoloration of lye hominy. Edward F. Kohman. *Research Laboratory, National Canners Assoc. Cir. 2-L*, Reprinted in *The Trade*, Apr. 3, pp. 14-24(1922).—Black discoloration in hominy has the same causes as that in corn, peas, and other products. The black material is iron sulfide. The search for a preventive treatment is described. A scrubbing process following the lyeing reduces the alkalinity of the hominy by removing the outer layer from the grains. C. O. Ball

132. Proper method of grading canned peas. Fred T. Stare. *Trade*, Feb. 6, pp. 48-52(1922); *Canning Age*, Feb., p. 14(1922).—With the use of four charts it is shown that it means money to the canner to install proper graders of capacity adequate to give him efficient sifting.

133. A sermonette for canners No. 10 dried peas soaked before canning. *Trade*, May 1, p. 40(1922).—The merits of general order No. 14, issued by the Commissioner of Markets of Wisconsin is discussed.

134. Copper in tinned peas. *Brit. Food J.* 24, p. 44(1922).--The Public Health Committee in Fulham, England, reports that several vendors against whom they had recommended proceedings for selling tinned peas certified by public analyst to contain sulfate of copper in amounts varying from .34 to .7 grains per pound, were dismissed by magistrate on the ground that the amount of copper was so small as to be negligible. They recommend that the Ministry of Health be informed of the unsuccessful prosecutions and that they be urged to make order prohibiting the use of copper or other injurious substance in the greening or preserving of vegetables. Edwin LeFevre

135. Swells, flat sours, and sub-standard peas. W. D. Bigelow. *Trade*, Feb. 6, p. 48(1922).—The causes and prevention of spoilage in peas are discussed. Processes are suggested which, although their absolute values may be changed as research progresses, are very nearly correct from the standpoint of equivalence in sterilizing value. They are: No. 2, 40 min. at 240°; No. 10, 50 min. at 240°; No. 2, 15 min. at 250°; No. 10, 20 min. at 250°. Thirteen causes of low quality are given. C. O. Ball

136. Pea grading. W. F. Christel. *Canner*, Nov. 25, p. 29(1922).

137. What canners, brokers, and distributors must do to increase consumption of canned peas. Harold R. White. *Trade*, Feb. 6, pp. 52-4(1922).

138. Labeling of "selected" peas. *Trade*, Apr. 24, p. 26(1922).—According to a Bureau of Chemistry announcement, the use of the word "selected" is improper as part of the designation for Nos. 4 and 5 peas. C. O. Ball

139. Amendments to Wisconsin pea labeling regulations. *Trade*, Apr. 24, p. 26(1922).

140. Permanent pea packing records, theeir value and use. F. A. Stare. *Canner*, Dec. 9, p. 27(1922).

141. Analyzing pea statistics. F. A. Stare. *Canning Age*, Dec., p. 5(1922).

142. A foreign aristocrat—the canned pea. James H. Collins. *Canning Age*, Nov., p. 17(1922).—A popular description of pea canning.

143. Some precautions in canning processes. W. D. Bigelow. *Am. Food J.*, Mar., p. 17; Apr., p. 11(1922).—Swells and flat sours in peas are both due to bacterial decomposition, which may be entirely prevented by tight sealing of the can and a sufficient process. Even though the seals be tight, spoilage may occur if the process has been insufficient. A process of 40 minutes for No. 2 cans and 50 minutes for No. 10 cans, both at 240 degrees, is recommended; or 15 and 20 minutes respectively at 250 degrees. Care should be taken that thermometers and pressure gauges are accurate and that the retort is held at the proper temperature. The reasons for sub-standard peas are as follows: 1, Unevenness in ripening or poor "roguing"; 2, lack of care at time of harvesting; 3, peas being allowed to remain too long on the vines after cutting; 4, peas being allowed to remain too long in boxes; 5, the mixing of mature and immature peas; 6, unnecessary heating either on the vine or in the box; 7, too much handling in boxes at the plant; 8, poor filling; 9, improper cooling; 10, hard water; 11, too much salt; 12, overblanching; and 13, poor judgment and care in processing. J. P. STREET

144. **A study of sweet potato varieties, with special reference to their canning quality.** C. A. MAGOON AND C. W. CULPEPPER. *U. S. Dept. Agr. Bull 1041*, 34 pp. pts. 3(1922).—The investigation covered a period of three seasons, during which various problems connected with the canning of sweet potatoes were studied, methods of canning standardized and over 40 varieties of sweet potatoes tested for comparative canning qualities. P. L. GOWEN

145. **Dehydrated pumpkin flour.** A. W. CHRISTIE. *Am. Food J.*, July, p. 7 (1922).

146. **Tin in canned pumpkin.** J. W. STEINHART. *Canner*, July 15, p. 32 (1922).

147. **Influence of certain factors on the chemical composition of sauerkraut.** O. R. BRUNKOW, W. H. PETERSON AND E. B. FRED. *J. Am. Chem. Soc.* 43, 2244-2255(1921); *J. Soc. Chem. Ind.* 41, 115A(1922).—B. lactis acidi gave a better grade of kraut than ordinary fermentation, 2% to 3% brine solution was used for the best results. This work is still in the experimental stage.
D. V. ALBERTS

148. **The production of pink sauer kraut by yeasts.** E. B. FRED AND W. H. PETERSON. *J. Bact.* 7, 257-70(1922).—The pink color of kraut is due to the growth of certain yeasts. Increasing the concentration of salt, acid or sugars increases the pink discoloration, likewise does the increase of temperature of fermentation. Inoculation with cultures of one of the bulgarian bacillus group resulted in increased production of pink color. L. V. BURTON

149. **Sauer kraut and its production.** EDWIN LEFEVRE. *Canner*, July 8, p. 27 (1922).

150. **Medicinal value of kraut.** WM. CLENDENIN. *Canner*, Feb. 25, part 2, p. 141(1922).—The calorific value of kraut compared with similar values for other foods is given.

151. **Occurrence and cause of discoloration in kraut.** DR. PETERSON. *Canner*, Feb. 25, part 2, p. 164(1922).—Bacteriological and chemical analyses of normal and discolored kraut are given and conclusions drawn from these analyses that discolored kraut is due to wild yeasts, high alcohol content, low lactic acid, low sugar content and the presence of large numbers of yeasts.
B. S. CLARK

152. **New law regulates spinach cook.** *Canning Age*, Apr., p. 11(1922).—California State Board of Health process regulations.

153. **Processing spinach.** *Trade*, May 1, p. 28(1922).—The processes suggested by the National Canners Association are at 240° for the following lengths of time: No. 1, 40 minutes; No. 2, 55 minutes; No. 2½, 70 minutes; No. 3, 75 minutes; No. 5, 95 minutes; and No. 10, 120 minutes. C. O. BALL

154. **Iron analysis of spinach, kale and turnip greens.** MARIETTA EICHEL-

berger and Maude Asbury. *J. Home Econ.* 14, 131-2(1922), through *C. A.* 16, 2559.—The iron contents of kale, turnip greens, and spinach, respectively, were, 0.00312, 0.00269, and 0.00272%. Helen N. Elliott

155. **Weights of spinach in cans of various sizes.** The cut-out weights for canned spinach announced in item 320, page 118, *Service and Regulatory Announcements*, Chemistry 24, and amended by item 365, page 31, *Service and Regulatory Announcements*, Chemistry 27, are further amended as follows:

No. 2: 3 7/16 by 4 9/16 inch sanitary and 3⅝ by 4 9/16 inch hole and cap		13 ounces.
No. 2½: 4 1/16 by 4 11/16 inch sanitary and 4 by 4¾ inch hole and cap	(19 ounces)	1 pound, 3 ounces.
No. 3: 4¼ by 4⅞ inch sanitary and 4 3/16 by 4⅞ inch hole and cap	(21.5 ounces)	1 pound, 5.5 ounces.
No. 10: 6 3/16 by 7 inch sanitary and 6¼ by 6¾ inch hole and cap	(66 ounces)	4 pounds, 2 ounces.

In other respects item 320 remains unchanged.

156. **Bacillus botulinus infection of canned spinach.** S. A. Koser, R. B. Edmondson and L. T. Giltner. *J. Am. Med. Assoc.* 77, 1250-53(1921); *Abstracts Bact.*, 6, 63(1922); through *C. A.* 16, 764.—B. botulinus, Type A, is able to multiply and produce its characteristic toxin when inoculated into canned spinach, although the development of the organism in this food product was found to be somewhat irregular. In some cases there was apparently neither growth nor toxin formation but in all of these the organism was found to be viable. A temperature of 37° accelerated the development. When multiplication had progressed readily 0.5 cc. of the spinach juice *per os* proved sufficient to kill guinea pigs, usually within 18 hours. In only one instance had toxin formation advanced to a stage such as to produce fatal results, without gas being evolved sufficient to cause bulging of the can. The condition of the can before opening, that is, whether springy or swelled, is of more value in detecting toxic cans than the odor. The destruction of foodstuffs deemed to be abnormal, either by the appearance of containers or by the odor, should prevent the greater number of outbreaks of botulism.

L. W. Riggs

157. **New weight for spinach.** National Canners' Association. *Trade*, Apr. 10, p. 8(1922).—Requirements on the cut-out weight for canned spinach as announced by the Bureau of Chemistry are: No. 2 can, 13 ozs.; No. 2½ can, 19 ozs.; No. 3 can, 21½ ozs.; No. 10 can, 66 ozs. The canner is urged not to reduce his process. C. O. Ball

158. **Research work of the National Canners Association.** R. I. Bentley. *Canner*, Feb. 25, part 2, p. 139(1922).—Review of laboratory work on processing of spinach.

159. **Canned tomato industry in Italy.** J. A. Shriver. *Canner*, Nov. 11, p. 23(1922).

160. **Tomatoes for health.** *Canner*, Sept. 23, p. 27(1922).

161. **Canning No. 10 tomato pulp.** O. C. Zinn. *Canner*, Nov. 25, p. 34 (1922).

162. **A practical plan to increase consumption of tomatoes.** *American Grocer*, Sept. 20, p. 5(1922).

163. **The story of tomatoes.** Paul Paver. *American Grocer*, Sept. 20, p. 5 (1922).—A discussion of healthfulness and food values of tomatoes.

164. **The virtues of yellow vegetables.** J. J. Williamson. *Am. Food J.* 16,

No. 10, 18(1921), through *C. A.* 16, 128.—A brief discussion of the relation of color to vitamin A content. Yellow and green vegetables are very like to contain a richer supply of this vitamin than the colorless ones.

H. A. Lepper

MARINE PRODUCTS

165. **Caviar and derived preparations.** P. Buttenberg. *Z. Nahr. Genussm.* 43, 79-85(1922).—A review of the varieties of caviar and their adulterations.

R. H. L.

166. **The source of caviar.** *Canner*, July 15, p. 32(1922).

167. **The chemical examination of canned fish.** G. Hinard. *Ann. fals.* 15, 72-79(1922).—Chemical examinations alone cannot be relied upon to determine the quality of canned fish. The bacteriological examination may, at times, furnish useful information. F. W. Tanner

168. **The canned fish pack for 1921.** *Canning Age*, May, p. 19(1922).—Official Bureau of Fisheries Statistics for U. S. and Alaska.

169. **The value of fish scales as a means of identification of the fish used in manufactured products.** R. E. Essery, B. Sc. A. I. C., *Analyst* 47, 163-5 (1922).—Scales of well known fish are characteristic in their appearance. By means of a microscopical examination of the scales found in various fish products, it is possible to determine the kinds of fish used in their manufacture.

F. J. Dashner

170. **Food value of canned salmon.** R. W. Clough. *Canner*, July 22, p. 27 (1922).

171. **The sources and characteristics of bacteria in decomposing salmon.** Albert C. Hunter. *J. Bact.* 7, 85-110(1922).—Examination was made of 316 cultures from sea water, decomposing salmon and from salmon canneries in southeastern Alaska. The majority were nonfermenting soil and water bacteria. Cultures obtained from canneries have little to do with decomposition of salmon; of such cultures 34% are correlated with sea water organisms. Bacteria concerned with decomposition of salmon are natural inhabitants of sea water and not a special type which contaminate the fish within the cannery. L. V. Burton

172. **Bacteriologist's investigation work on salmon.** C. R. Fellers. *Canner,* July 29, p. 31(1922).

173. **Canned salmon.** Ray W. Clough. *National Canners Assoc. Pacific Fisheries Investigations. Report of chemist 1921,* through *C. A.* 16, 2184.—The fat content of different cuts of 5 species of salmon differ greatly. Near the gills including the belly and back on 2 king salmon it was 20.15 and 15.10% and near the tail on the same fish it was 11.11 and 8.10%. Protein is practically the same on all species; oil varies greatly. The amount of free oil and free liquor increases in canned salmon on storage. A peculiar liver-like substance usually formed in canned salmon was coagulated extracted protein and is found in fish canned when fresh or tainted. Exhausting did not appear to affect the *indole content* of stale or tainted fish. Decomposition in salmon may often take place without production of skatole and indole. Out of 488 strains of bacteria taken from salmon 99 produced indole and skatole when grown on salmon. No details are reported. Cf. *C. A.* 15, 1360. H. A. Lepper

174. **Decomposition of "feedy" salmon.** Albert C. Hunter. *Am. J. Hyg.* 2, 368-378(1922).—The increase in the practice of catching small immature

salmon was the basis of this investigation. The rate of decomposition of "feedy" salmon in comparison with that of the mature fish returning on the spawning migration was determined. Total bacteria count as a means of judging quality is of value only when applied to the mature nonfeeding fish. In the case of the immature feeding salmon the presence of food lodged in the alimentary tract increases not only the amount but also the effect of bacterial action. W. D. GRIMMER

175. Treatise on British Columbia salmon. W. D. BURDIS. *Canner*, Dec. 2, p. 41 (1922).—Some quotations from a pamphlet on salmon by the author.

176. Canned salmon not guilty. *Canner*, Nov. 25, p. 43 (1922).

177. A comparative study of spoilage in salmon. A. C. HUNTER. *Am. Food J.*, Sept., p. 19 (1922).—In a study of the spoilage of humpback salmon caught on the spawning migration in Puget Sound, and of humpback salmon taken from the spawning grounds of the Green River, it was found that a somewhat different rate and a different type of spoilage takes place in the two groups. The difference in the total number of bacteria in the gills, in the flesh of the back and belly, in the pyloric ceca, in the stomach, and in the intestines of the two groups was not great enough to explain the difference in the rate of spoilage. A study of the aerobic and anaerobic organisms representing the bacterial flora of these decomposing salmon indicates that practically the same bacteria are responsible for the decomposition in both groups. In addition to the bacteria previously described by the author (*J. Bact.* 5, 543-552, 85-109), several sporulating anaerobes were isolated from the decomposing flesh. It is probable that the difference in the rate and type of spoilage in the two groups of salmon is due to a considerable difference in chemical composition of the fish rather than to any appreciable difference in bacterial flora. J. P. STREET

178. A Norwegian sardine factory. *Canning Age*, Jan., p. 26 (1922).—Brief description of plant and process at Trondhjen, Norway.

179. Occurrence of struvite in canned shrimp. C. S. PURCELL AND C. H. HICKEY. *Analyst* 47, 16-18 (1922).—Canned Barataria shrimp were examined for supposed particles of glass. Upon microscopic and chemical examination of the particles, they were identified as crystals of the mineral struvite (magnesium ammonium phosphate). Methods for the identification of this compound are given. F. J. DASHNER

[Note by editor:—This compound occurs naturally in canned shrimp.]

180. Method of canning tuna in Normandy, Sea Food Company's San Diego plant. E. M. BURCH. *Canner*, Sept. 2, p. 32 (1922).

181. Value of whale meat as human food. AGNES FAY MORGAN AND EDITH L. BROWN. *J. Home Econ.*, June, pp. 267-70 (1922).

182. The bacteriology of canned meat and fish. W. G. SAVAGE, R. F. HUNWICKE AND R. B. CALDER. Food Investigation Board, *Special Report No.* 11.—Over 360 cans of meat and fish products were examined, 323 of which were subjected to a bacteriological test. These consisted of 116 cans of meat and 207 cans of marine products. They comprise two groups, of which 246 fall into the group designated as defective samples and 77 into the group of shop samples or samples bought at stores. The organisms isolated from these samples have been classified into six groups, namely: 1. moulds and yeasts, 4 samples; 2, obligate anaerobic bacilli, 27 samples; 3, sporing aerobic bacilli (excluding thermophiles), 78 samples; 4, thermophilic bacteria, 47 samples; 5, nonsporing aerobic bacilli, 78 samples; and 6, micrococci, 73 samples. The

76 shop samples, the contents of which were perfectly good, showed 61.8% not sterile due almost entirely to the presence of sporing aerobic bacilli, thermophilic sporing bacilli and micrococci which are regarded as survivors of bacteria originally present and not as additions through leaks. These bacilli do not in any way injure the foods in which they are present because of their inability to multiply and cause decomposition under the existing conditions. No bacilli possessing any virulence or toxicity to man were isolated and the presence of sporing bacilli does not throw any suspicion upon the wholesomeness of the samples. To insure the absence, or at least a minimum, of spoilage, manufacturers are urged to obtain their food products as fresh as practicable, to can them as speedily as possible under conditions of great cleanliness, to treat their products so as to insure the presence of a vacuum, to employ the right processing temperatures, and by the use of good quality tin plate and efficient closing methods to avoid causes of leakage and maintain the vacuum obtained. J. R. ESTY

183. **Report of food investigaton board.** *Brit. Food J.* 24, 102(1922).—Investigations of Canned Foods Committee enable deductions to be drawn of great practical importance in connection with canning of meat and fish. It was found that commercial puree used in the manufacture of canned herrings contains considerable amounts of tin. In one case this amounted to 0.6 grain per pound. The amounts of tin dissolved by different specimens of puree from pure tin plate or from tin coated iron plate were approximately proportional to amounts of free acid present. Tin was also dissolved to some extent by solution of the sodium, calcium, and ammonium salts of these acids and the constituents of the herring alone exercised some solvent action on the tin during cooking process. Commercial puree dissolved more tin from tin coated iron plate than from pure tin plate. It appeared that tin was dissolved progressively by these products during storage periods. One specimen seven years old was found to contain as much as 9.6 grains of tin per pound. EDWIN LEFEVRE

184. **Department of Scientific and Industrial Research.** *Food Investigation Board.* Methods used for the inspection of canned foods. (Part II Canned marine products). *Analyst* 47, 350(1922).—The data discussed in the report refer to the tinned marine products entering British ports, including salmon, herring, sardines, lobster, crabs, and to a less extent, crayfish.

F. J. DASHNER

185. **Penetration of salt in fish frozen in chilled brine.** L. H. ALMY AND E. FIELD. *J. Ind. Eng. Chem.* 13, 927-930(1921); *J. Soc. Chem. Ind.* 41, 29A (1922).—Fish immersed for 2 hours in brine at 0°-12° F. small quantities of salt penetrated ⅛ inch deep. Salt content in layer 2.88% salt. Variations in temperature had little effect. D. V. ALBERTS

186. **Antidote for lobster smut found.** F. C. HARRISON AND E. G. HOOD. Macdonald College, Quebec. *A publication of the Council for Scientific and Industrial Research, Ottawa, Canada.* Through *Canadian Fisherman* 10, No. 2, Feb., 33-35(1923).—The blackening of lobster after canning is a serious problem. By far the greater amount of trouble is due to chemical action, the rest to bacterial. The sanitary conditions of packing and thorough sterilization will remove the cause due to bacterial discoloration. By the use of an acid pickle containing acetic or citric acid chemical discoloration may be eliminated. The use of retorts to sterilize lobster instead of boiling water bath is strongly recommended. The use of heavily coated tin plate does not

prevent this lobster discoloration but delays it; therefore use of coating 2½ pounds of tin to the base box is recommended. Enameled or lacquered cans showed no improvement over ordinary can with parchment lining. Tight seams are necessary to prevent entrance of air and consequent formation of rust followed by blackening. Flux, rosin, or soldering preparation have no appreciable effect in discoloration. The canning of lobsters dead some time and the use of decomposed meat in general increases the amount of discoloration. The lobster blood should be carefully removed from the flesh. Discoloration is not influenced by the percentage of salt used in the pickle. The use of polluted sea or well water seems to infect the lobster meat with bacteria which will cause trouble, particularly if the cans are not sufficiently sterilized. Sanitary conditions in and around the factories, cleanliness of employees, etc., are all necessary to insure freedom from blackening. Zinc top cans seem to have some merit in eliminating blackening, but definite recommendations cannot yet be made. Final washing of all lobster meat should be made in acid water containing 1 oz. of either acetic or citric acid to the gallon of clean fresh water. The lobster meat should be canned with the acid pickle, which consists of 3 to 6 per cent salt solution, to each gallon of which 2 ozs. of glacial acetic, or pure citric acid are added. The lobster meat is folded in paper and the cans closed and sterilized as soon as possible, no exhaust apparently being recommended. One-quarter pound cans should be sterilized at 240° to 245° F. for 35 minutes; one-half pound cans should be sterilized 240° to 245° F. for 45 minutes. The cans should be stored on their sides in a cool place. (Abstractor's note:—The use of organic acids in the canning of lobster and crab, which are prone to blackening in the can, has been the custom for some years. The largest packers of crab meat are in Japan, and they are supposed to have obtained a product free from blackening by the use of lactic, acetic, or citric acid. The packing of crab meat in Southeastern Alaska is just beginning to be an industry. Secret processes are supposed to be employed, but they undoubtedly are based on the use of organic acids to retard the blackening). E. D. CLARK

187. Salt cod reddening traced to sea salt. F. C. HARRISON. Macdonald College, Quebec. *A publication of the Council for Scientific and Industrial Research, Ottawa, Canada.* Through *Canadian Fisherman* 9, No. 5, 90(1922); 9, No. 6, 109-10, 129(1922).—The reddening of salt cod fish causes large annual losses each year to American and Canadian fish curing establishments. The sea salt ordinarily used in curing cod has been shown to be the cause of the trouble. The reddening is due to the growth of two microorganisms from the sea salt. At first a pale pink coloration is produced by the growth of a "spirochaete" and the deep red color by the growth of a bacillus form. The optimum concentration for the growth of these organisms seems to be the saturation point, whether they grow on heavily salted fish, in brine, or piles of salt, or artificial matter saturated with salt. The optimum temperature for the growth of both organisms is 122° to 172° F. Sunlight does not kill these organisms. These facts indicate that the salt water lagoons of the tropics were the probable source of the organisms. Mined salt and salt wells seem to be free from these organisms. Sea salt kiln-dryed at a temperature of 212° F. for 30 minutes will destroy the infection. A thorough disinfection of the salt fish plants and equipment is recommended, as they are all known to be thoroughly infected with these organisms at the present time.

E. D. CLARK.

188. New codfish dressing machine. *Pacific Fisherman Year Book* 1921, p. 94.—A description is given of the "Iron Splitter" which is designed to do for the codfish what the "Iron Chink" has done for the salmon packers. It will handle 60 fish per minute delivering them properly split and ready for salting, with heads, viscera, backbones and black napes removed.

RAY W. CLOUGH

189. Preservation of fish nets—II. Linen thread. HARDEN F. TAYLOR AND ARTHUR W. WELLS. *Pacific Fisherman* 21, No. 1, p. 8 (1923).—Heavy preservatives such as tars, copper points, petroleum products, gilsonite, etc., if applied to linen nets or lines render them unfit for the purposes to which they are usually put. Copper oleate appeared to be the best substance to use on linen nets, preserving the tensile strength and leaving the net perfectly soft and pliable. RAY W. CLOUGH

190. Filleting of fish. HARDEN F. TAYLOR. *Pacific Fisherman* 21, No. 3, p. 9 (1923).—This consists of scaling and dressing the fish, splitting and removing the backbone. The two sides, or fillets, are washed in cold salt water, wrapped in parchment paper and chilled. They are then packed in metal containers and shipped surrounded by ice. This method has many advantages; (1) the entire piece is edible; (2) there is no cleaning to be done; (3) shipping weight is reduced; and (4) waste can be concentrated, and utilized. There are also disadvantages; (1) customer cannot judge of condition of fish as eyes and gills are gone; (2) customer cannot identify the fish as well; (3) the fillets may be bleached by melting ice; (4) it requires more labor to prepare, hence is higher in price than roundfish. RAY W. CLOUGH

191. Investigations of fishing net preservatives. HARDEN F. TAYLOR AND ARTHUR W. WELLS. *Pacific Fisherman* 20, No. 11, 8-11 (1922).—The value of various preservatives such as tar, barking, copper paint, copper oleate, etc., in preserving cotton lines when exposed to the action of weather and sea water was determined. The results show that those preservatives containing copper are superior to the others. Copper paint while preserving tensile strength increases the weight and stiffness of the line and decreases resistance to abrasion. Copper oleate gave the best results.

RAY W. CLOUGH

192. New fisheries laboratory for California. *Pacific Fisherman* 20, No. 1, p. 15 (1922).—This laboratory is located at Fish Harbor, San Pedro and under the direction of Will F. Thompson.

193. Making bloater and buckling herring. H. H. HUNGERFORD. *Pacific Fisherman* 20, No. 1, p. 35 (1922).—A brief description of the process of preparing these products.

194. Control of temperature in fish canneries. *Pacific Fisherman* 20, No. 5, p. 14 (1922).—Reasons for using control apparatus operated by temperature rather than by pressure.

195. Yearly cycle of the Pacific herring. H. H. HUNGERFORD. *Pacific Fisherman* 20, No. 4, p. 42 (1922).—An ingenious chart showing the proper time of year in which to prepare the various products made from the herring.

RAY W. CLOUGH

196. Use of thermometers in fish canneries. LEON S. LYON. *Pacific Fisherman* 20, No. 2, p. 9 (1922).—Proper types of thermometers and proper installation are urged. Frequently the stems of thermometers used on exhaust boxes are so short as not to extend beyond the heavy plank top, and temperature readings are much too low. RAY W. CLOUGH

197. **The tunas of southern California.** LOUIS D. ELLIOTT. *Pacific Fisherman* 20, No. 2, p. 12(1922).—There is no tuna family as such. Each of the four tunas commercially canned is a separate species of the *Scombridae* or mackerel family. Albacore, bluefin and yellowfin may be labeled tuna while striped tuna must bear the qualifying adjective "striped." A description and picture of each species is given. RAY W. CLOUGH

198. **The return of marked king salmon grilse.** J. O. SNYDER. *California Fish and Game*, April, p. 102(1922).

199. **Danger to fisheries from oil and tar pollution.** *California Fish and Game*, April, p. 129(1922).

200. **Migrating salmon at the Redding (Cal.) dam.** E. A. MCGREGOR. *California Fish and Game*, July, p. 141(1922).—A study of the efforts of the fish to pass the obstruction.

201. **Observations on the egg yield of Klamath river king salmon.** E. A. MCGREGOR. *California Fish and Game*, July, p. 161(1922).

202. **The fisheries of California and their care.** WILL F. THOMPSON. *California Fish and Game*, July, p. 165(1922).

203. **Salt absorption by brine frozen fish.** L. H. ALMY AND E. FIELD. *Fishing Gazette* 39, No. 1, 20-21(1922).—The flesh of fish which have been frozen quickly in a brine solution of low temperature appears to be little affected by the process of freezing. Little separation of water from the muscle fibers occurs when fish are rapidly frozen, the texture therefore of slowly frozen fish is softer than those rapidly frozen. Fish absorb only small and negligible quantities of salt from the brine during the freezing process. C. R. FELLERS

204. **The shrinkage of fish in boxes and barrels.** L. H. ALMY, H. R. HILL AND E. FIELD. *Fishing Gazette* 39, No. 9, 29-30(1922).—Comparative data are presented to show that shrinkage is greater in iced fish when shipped in barrels C. R. FELLERS

205. **Herring the most valuable fish.** HORATIO CRIE. *Fishing Gazette* 39, No. 8, 37-39(1922).—A history of the herring industry as related particularly to Maine. C. R. FELLERS

206. **The Norwegian cod fisheries.** C. L. ANDERSON. *Fishing Gazette* 39, No. 7, 20-22(1922).—A general discussion of the cod industry in Norway. C. R. FELLERS

207. **The Norwegian method of curing codfish.** *Fishing Gazette* 39, No. 3, 27-30(1922).—The old method was to dry in the open air without any process. The more modern method consists in first salting and then drying the fish. Cod cured in this manner is called "Klipfisk" and is an important article of commerce. There are four grades of "Klipfisk." C. R. FELLERS

208. **Inspection at the source.** J. C. WHEELER. *Fishing Gazette* 38, No. 11, 14-15(1921).—A discussion of Federal Fish Inspection at the source, similar to the present U. S. Meat Inspection Laws. It is believed it would materially improve quality of the pack. C. R. FELLERS

209. **Cold storage of fish in Massachusetts.** H. C. LYTHGOE. *Fishing Gazette* 38, No. 11, 43-46(1921).—A general discussion of cold storage problems. Food remains wholesome and practically unchanged if stored strictly in compliance with the laws. Storage is ordinarily limited to 12 months in Massachusetts. Foods are placed in cold storage because of the presence of an excess over normal consumption. C. R. FELLERS

210. **Fourth annual convention of U. S. fisheries association.** *Fishing Gazette* 39, No. 10, 23-31(1922).—A report of proceedings. C. R. FELLERS

211. Fresh and frozen fish marketing. L. T. HOPKINSON. *Fishing Gazette* 39, No. 10, 32-33(1922).—A report on surveys of fish marketing in 7 large cities of the U. S. C. R. FELLERS

212. Making money out of fish waste. STANLEY HILLER. *Fishing Gazette* 39, No. 10, 33(1922).—A report on methods of utilizing fish wastes. C. R. FELLERS

213. Notes on preservation of fish nets and twine. H. F. TAYLOR. *Fishing Gazette* 39, No. 10, 34-35(1922).—The use of copper oleate as a preservative for nets in salt water is advocated. C. R. FELLERS

214. Fish transportation by sea from coast to coast. *Fishing Gazette* 39, No. 4, 40(1922).—Refers to the use of recently established steamship service from Pacific Coast to New York and Boston in marketing fresh, canned and salt fish. C. R. FELLERS

215. Measured by any standard, there is no better food than fish. ROYAL S. COPELAND. *Fishing Gazette* 39, No. 4, 34(1922).—An appeal to the public to use more fish because of its high food value, palatability, cheapness and freedom from dangerous substances inimical to health. C. R. FELLERS

216. Standardizing the fish container. *Fishing Gazette* 39, No. 12, 15 (1922).—A plea for standardizing the size of containers for smoked, pickled, salt and canned fish. C. R. FELLERS

217. Menhaden oil as a constituent of paint. HENRY A. GARDNER. *Fishing Gazette* 39, No. 4, 99(1922).—A review of the use of Menhaden Oil in the paint and varnish industries. Circ. No. 68, Educational Bureau, Paint Manufacturers' Association of the U. S., Washington, D. C., Aug., 1919. C. R. FELLERS

218. Making waste herring into profitable fertilizer in Maine. FRED G. MILLIKEN. *Fishing Gazette* 39, No. 4, 86-87(1922).—The waste herring and offal is cooked under steam pressure, pressed to remove oil, dried in large steam jacketed drums and sacked. Ordinarily herring containing "red feed" are considered as unfit for canning and are utilized as oil and fertilizer. C. R. FELLERS

219. Review of Pacific coast fisheries, 1921. *Fishing Gazette* 39, No. 4, 70-71 (1922).

220. Review of fisheries of Canada for 1921. *Fishing Gazette* 39, No. 4, 73-74(1922).

221. Fisheries courses at Boston Institute of Technology. *Fishing Gazette* 39, No. 4, 54(1922).—Among the courses given are Oceanography and Limnology. C. R. FELLERS

222. Preservation of fish frozen in chilled brine. L. H. ALMY AND E. FIELD. *J. Ind. Eng. Chem.* 14, 203-6(1922); *Analyst* 47, 306-7(1922).—Fish were frozen in air at – 10° C. and in 10% brine at its freezing point. Results obtained after some months of cold storage warrant little choice between these two methods. F. J. DASHNER

223. The inspection of canned foods. *Brit. Food J.* 24, 72(1922).—In report prepared by Dr. William S. Savage issued by the Food Investigation Board of the Department of Industrial and Scientific Research methods employed in canning various marine products are given, also useful information in regard to methods of inspection at ports of entry and centers of distribution. At ports 10% are examined but if proportion of rejects are considerable the whole consignment is held back until Port Inspector can examine sufficient number of cans to enable him to give judgment. Blown tins are instantly rejected but it is recognized that there are doubtful cases due to diversity of products and methods of canning. Suggestions are made in regard to present standards and possible improvements. EDWIN LEFEVRE

MILK AND MILK PRODUCTS

(*See also numbers 287, 296, 316 and 378*)

224. **Inspection of milk in the factory.** GEORGE GRINDROD. *Canning Age*, July, p. 9-13; Aug., p. 19-22; Sept., p. 15-17(1922).

225. **Some precautions in canning processes.** W. D. BIGELOW. *Am. Food J.*, Mar., p. 17; Apr., p. 11(1922).—Recent studies on spoilage in evaporated milk and peas are reviewed. It is pointed out that consistency is by no means a measure of sterilization; certain more resistant bacteria may be present and a higher or longer process will be needed for their destruction. Where the sterilizing process has been insufficient, spoilage may begin at once, and be evident before shipment, or it may develop slowly and not show for a year or more. Different kinds of resistant bacteria are present in evaporated milk. Some produce gas, others acid and still others bitter flavors. All of these are unusually resistant to heat. Charts are given showing the necessary time for sterilization in the presence of certain resistant types at various temperatures. The process time and temperatures suggested are probably extreme, but the value of sterilizing at as high a temperature as the milk will stand is emphasized.

226. **Temperature (of storage) and keeping qualities of canned foods.** B. N. BALDWIN. *Am. Food J.*, p. 33(1922).—Beet greens, beets, green string beans, wax beans, carrots, corn, tomatoes and pumpkin were properly prepared, steam-blanched, cold dipped, packed and processed; then stored at the temperatures to which canned vegetables are subjected in the home—the vegetable cellar and the kitchen. Storage at kitchen temperature for 10 days caused far greater spoilage than storage at cellar temperature for four months or even for 10 days. About one-half of the vegetables stored at kitchen temperature spoiled and only one-twelfth of those at cellar temperature. The above were home-canned vegetables. The temperature of storage should be a factor in determining optimum time required for processing. In general, commercially canned foods are processed at a much higher temperature than home-canned. Even with these, however, reasonably cool storage is to be preferred. J. P. STREET

227. **The value of a titration test for acidity at the receiving platform.** R. S. FLEMING AND J. H. NAIR. *J. Dairy Sci.* 4, 536-45(1921), through *C. A.* 16, 1280.—The acidity of milk was tested during Jan., Mar., July, Sept., and Oct., on 766 mixed herds. Normal acidity of fresh milk of individual cows is 0.14-0.145%, that of herd milk as received at the factory is 0.14%. Where milk is handled in a cleanly and sanitary manner it will not be rejected on the basis of the acid test now used. Advantages of the acid test warrant its use until some equally rapid and more dependable method is perfected. No injustice to the producer results in the manufacturer's insisting on an acidity below 0.17-0.18%, especially when the test issued as an adjunct to the nose and palate of experienced inspectors. H. A. LEPPER

228. **The action of metals on milk.** MAX DONAUER. *Milk Dealer*, Feb., p. 40-6(1922).

229. **Factors influencing coagulation temperature in evaporated milk.** L. A.

ROGERS. *Canner* 52, 165-6(1921); *Expt. Sta. Record* 45, 111, through *C. A.* 16, 3139.—R. discusses the conclusion drawn by Sommer and Hart (*C. A.* 14, 985) that the chief factor in the heat coagulation of fresh milk is the composition of the milk salts. He shows that, while this may be true of fresh milk from individual cows, in herd milk other factors enter which have so great an influence on the curdling temperature that the effect of the composition of the salts is almost entirely obscured. Of these factors the most important is considered to be the growth of bacteria not only of acid-forming types but of types which produce a rennin or milk-curdling enzyme without increasing the acidity of the milk. Experiments are cited. H. G.

230. **Physical and chemical changes of milk during pasteurization.** A. F. WEINLIG. *Forsch. Geb. Milchwirtsch u. Molkereiwes* 2, 127-169, 175-205(1922); *Chem. Tenti.* 93, IV 593-594(1922); *J. Soc. Chem. Ind.* 41, 833A(1922).

231. **Processing of evaporated milk.** W. D. BIGELOW. *Trade,* Feb. 13, pp. 12-4(1922).—The importance of accuracy in sterilizer control is stressed. Separate points are made realistic by the inclusion of specific data. Tentative process times are given. Four figures. C. O. BALL

232. **Process of preserving milk.** C. L. ARNOLDI, U. S. P. 1,403,223 10.1.22 Appl. 5.2.21, *J. Soc. Chem. Ind.* 41, 154A(1922).

233. **Dairy industry work by Wisconsin Agr. Exp. Sta.** *The Creamery and Milk Plant Monthly,* June, p. 27-29(1922).—Excerpts from annual report include studies made of spoiled evaporated milk by Bacteriology Department and covered the development of a very firm curd and the development of a bitter taste. Spoilage was traced to spores of certain aerobic bacteria. Due to free oxygen present, because of filling cans cold, and also the limited degree of heat that can be used in the sterilization of milk, these troubles will be difficult to overcome unless some way of exhausting the can is devised.

Studies on coagulation made by Mr. H. H. Sommer showed that the three normal milk salts, sodium citrate, sodium or potassium phosphate and calcium chloride when added to evaporated milk in small amounts have a decided effect upon the coagulation during sterilization. If coagulation is caused by an excess of sodium citrates and sodium or potassium phosphates it may be prevented by an addition of calcium salts as the effect of these two salts seem to balance each other and apparently it is necessary that they be present in some definite proportion if the condensing of the milk product is to be successful. Sodium bicarbonate, long used by condensors whenever coagulation appeared, was found in one case to hasten coagulation. He recommends the testing of a series of samples by adding increasing amounts of the normal milk salts and examining samples after sterilizing to determine optimum amount of salt needed to prevent coagulation. This allows testing of all milk before canning. L. W. GRAASKAMP

234. **Score cards for sweetened condensed and evaporated milk and ice cream.** J. H. FRANDSEN. *The Creamery and Milk Plant Monthly,* June, p. 74 (1922).

235. **The quantitative relation between the vitamin content of feed eaten and milk produced.** J. S. HUGHES, J. B. FITCH AND H. W. CAVE. *Proc. Am. Soc. Biol. Chem., J. Biol. Chem.* 46, 1(1921), *C. A.* 16, 1795.

236. **The comparative antiscorbutic values of milk.** J. M. JOHNSON AND C. W. COOPER. *Pub. Health Rep.* 1022, 37, 989-1021, through *Abstracts Bact.* 6, 417(1922).—The milk studied in this work included fresh raw milk, certified milk, pasteurized milk, "reconstructed" milk, whole milk made by the spray

process and other process milk powder. It was found that the antiscorbutic vitamin in fresh milk is not very great and is injured by the process of drying. One particular brand of dried milk powder appears to have retained a large amount of its antiscorbutic substance, due probably to the extreme care in its preparation. Other brands made by the same process and by the same company are deficient in the substance. J. R. ESTY

237. **Analytical researches on the aging of condensed milk.** G. VIALE AND A. RABRENO. *Biochem. e terapia sper.* 8, 324-52(1921), *C. A.* 16, 2558.—An extensive study of the changes occurring in condensed milk on aging.

238. **The story of condensed milk.** JAMES H. COLLINS. *Canning Age,* Dec., p. 11(1922).

239. **New British regulations affect American condensed milk trade.** *The Creamery and Milk Plant Monthly,* Mar., p. 31(1922).—The chief change calls for 9% of fat in full cream unsweetened and sweetened milk as compared with 7.8% of fat in unsweetened milk and 8% in sweetened milk in present American and Canadian standards. L. W. GRAASKAMP

240. **European trade in condensed milk.** *Am. Food J.*, May, p. 31(1922).—A review of the trade possibilities for this product in France, Switzerland, the Netherlands, Austria and other continental countries.

241. **Milk and other liquid substances. Device for atomising and drying or evaporating.** P. MILLER. U. S. P. 1, 397,445-15.11.21 Appl. 24.2.20; *J. Soc. Chem. Ind.* 41, 30A(1922).

242. **Claims new canned milk process.** *Trade,* Mar. 27, pp. 22-4(1922).—A patented process, which includes carbonation, has been evolved.

C. O. BALL

243. **Commercial future of powdered milk.** G. STARR. *Am. Food J.*, July p. 18(1922).—In spite of the advantages, economy and desirability of this product, especially the skim milk variety, its progress will probably be slow until its value is established through education and eventually it becomes a household article.

244. **Dried milk commended by food experts.** *Am. Food J.*, Apr., p. 15 (1922).—A report by the committee on nutritional problems of the Am. Pub. Health Assoc., which sets forth the nutritive value of dried milk, even for infant feeding, and urges the development of the industry to increase and conserve the nation's milk supply.

245. **Machine for canning powdered milk.** *Am. Food J.*, Nov., p. 18(1922).—Description of a machine devised by Heath for putting up powdered milk or similar products in a sterile atmosphere. A plunger is inserted into the can of milk, which by the use of a vacuum pump exhausts the air contained in the can, at the same time forcing carbon dioxide or a similar gas into the lower part of the container, thereby forcing out the remaining air preparatory to sealing. J. P. STREET

246. **Report of the committee on nutritional problems (dried milks).** H. C. SHERMAN, C. E. A. WINSLOW, E. L. FISK, J. GREENWALD. *Am. J. Pub. Health* 12, 113-6(1922).

247. **Determination of moisture content of dried milk.** G. E. HOLM. *J. Assoc. Official Agr. Chem.* 5, 509-511(1922); *J. Soc. Chem. Ind.* 41, 680A (1922).—Dry for one hour at 100° C. in a vacuum of about 25 inches for complete dehydration. D. V. ALBERTS

248. **Canning the waste in milk.** *Canning Age,* Mar., p. 21(1922).—

Description of manufacture of "Hebe" at plant of Carnation Milk Products Co., Oconomowoc, Wis.

249. **Wisconsin Supreme Court upholds constitutionality of "filled milk" law.** *The Milk Dealer,* Aug., pp. 76-82(1922).—Decision of the Court prohibiting sale and manufacture.

250. **New Jersey passes law to prohibit sales of filled milk.** *The Milk Dealer,* May, p. 8(1922).—Complete text of the law.

251. **New York adopts "filled milk bill."** *Am. Food J.,* Apr., p. 13(1922).—The bill is similar to the Wisconsin bill, among other things prohibiting the use of any fat or oil other than milk fat in products in imitation or semblance of condensed, evaporated, concentrated, powdered, dried or desiccated milk.

252. **Kentucky bill for milk and milk production.** *The Creamery and Milk Plant Monthly,* April, p. 76(1922).

253. **What Kraft has done with cheese.** S. K. ROBINSON. *Canning Age,* July, p. 15(1922).

MISCELLANEOUS PRODUCTS

254. **To standardize mushroom grading.** *Canner,* Apr. 22, p. 45(1922).

255. **Pickle and sauer kraut experiments.** E. LEFEVRE. *Abstracts Bact.* 6, 24(1922).—An essential factor in all brine fermentations is a well defined group of the lacto-bacilli. The most favorable medium for growth are vegetable juices (cucumber and cabbage) at 30° C. The fermenting activity decreases in the same ratio centigrade as the temperature falls below optimum. The use of pure cultures as starters in fermentation of brined products is of no great practical value. The use of cultures of properly selected organisms may improve the flavor of these products. J. R. ESTY

256. **Pickling investigation during 1921.** EDWIN LEFEVRE. *Canner,* Feb. 25, part 2, p. 173(1922).

257. **Canning pimentoes in Georgia.** *Canner,* Sept. 2, p. 36(1922).

258. **The mineral constituents of potatoes and potato flour: Effect of process of manufacture on the composition of the ash of potato flour.** C. E. MANGELS. *J. Ind. Eng. Chem.* 13, 418(1921).

259. **New method for making cane syrup proves successful commercially.** *Am. Food J.,* June, p. 10(1922).—Brief reference to a new process developed by the Bureau of Chemistry in which invertase is used to prevent fermentation and crystallization.

260. **Sugaring of syrup.** WALTON. *Canner,* Feb. 25, part 2, p. 123(1922).—Discussion of use of invertase in the preparation of cane syrups with its relation to prevention of fermentation. B. S. CLARK

261. **Table syrup from sweet corn stalks.** *Canner,* Aug. 26, p. 33(1922).

262. **Invertase process of manufacturing sugar.** J. K. DALE AND C. S. HUDSON. *Am. Food J.,* Aug., p. 27(1922).—Invertase has been suggested for use in the manufacture of cane syrups to prevent fermentation and crystallization. The invertase is now produced commercially from brewers' yeast, and in spite of the increased trouble and cost of manufacture, it is believed these disadvantages are more than counterbalanced by the securing of a syrup that will not readily ferment or crystallize. J. P. STREET

263. **The comparative sweetness and preserving quality of cane and beet sugar.** JAMES P. OGILVIE, *J. Soc. Chem. Ind.* 41, 343R-345R(1922).—The presence of acid, salts and alkali influence the sweetness as to taste. There

is no difference in the preserving quality between the pure cane and pure beet sugar. D. V. ALBERTS

264. **Relative sweetness of invert sugar.** J. W. SALE AND W. W. SKINNER. *J. Ind. Eng. Chem.* 14, 522-5(1922), *C. A.* 16, 2615.—Invert sugar prepared in solution by the acid or by the invertase method is, contrary to accepted belief, 11% less sweet than the equivalent amount of cane sugar.

A. E. STEVENSON

265. **The use of invertase.** MR. WATSON. *Trade*, Feb. 6, pp. 66-7(1922).

266. **Experimenting with bottled vinegar.** S. L. CRAWFORD. *Am. Vinegar Ind.* 1, No. 6, 23-4(1922); *C. A.* 16, 1818.—Methods for preventing cloudiness are discussed.

267. **Some factors in fermentation of vinegar stock.** W. V. CRUESS. *Canner*, Sept. 2, p. 46(1922).

268. **Result of some vinegar investigations.** C. H. HUNT. *Am. Food J.*, Sept., p. 11(1922).—The experiments showed that Western apples, whether grown in irrigated or nonirrigated orchards, will produce vinegar which has the same chemical constants as vinegar made from Eastern apples.

J. P. STREET

269. **Vinegar—an every day necessity.** ROBERT W. BROOKS. *Canning Age*, Dec., p. 27(1922).

270. **The resistance of the vinegar eel to different agents.** NAPOLEONE PASSERINI. *Staz. sper. agrar. ital.* 54, 15-64(1921); *C. A.* 16, 594; cf. *C. A.* 15, 2957.—The effect of a large number of chemicals on vinegar eels is given; also other treatments are discussed.

271. **Effect of cold storage upon the carnosine content of meat.** W. M. CLIFFORD. *Biochem. J.* 16, 341-43(1922); *Analyst* 47, 443(1922).—Cold storage of meats causes a diminution of carnosine content to one third of that found in freshly killed meat. Further investigation is being carried out to elucidate the cause of loss of same, and deduce a curve from which the cold storage of meat may be determined from an estimation of the carnosine present.

F. J. DASHNER

272. **The chemistry of flesh foods. No. 5, The nitrogenous constituents of meat-extracts.** A. M. WRIGHT, J. F. BEVIS, AND P. S. NELSON. *Transactions of the New Zealand Institute* 53, pp. 479-83(1921).—Methods of manufacture, testing for decomposition and analyses of meat extracts are given.

A. E. STEVENSON

273. **Indications for bacteriological meat inspection.** M. CHRISTIANSEN. MAANEDSSKR. F. DYRLAEGER. *Copenhagen.* 33, 225-39(1921).—Bacteriological methods are indispensable in meat inspection. Microscopic examination is not sufficiently definite. Infections of domestic animals, in which circulating blood may be invaded by bacteria, may run their course with such slight or indefinite lesions that diagnosis of butchered animals can either not be made or the conclusions drawn are merely a matter of opinion. This is especially the case in those diseases caused by the paratyphoid group of organisms. Bacteriological inspection establishes a means to pass upon meat for food which without it would be condemned. J. R. ESTY

274. **Chemical technology of the frozen-meat industry.** A. M. WRIGHT. *The New Zealand J. Science and Technology* 4, No. 2, pp. 74-83; No. 3, pp. 97-107; No. 4, pp. 155-64(1921).—A statement of methods used in the production of frozen meat, also methods used in meat canning, preparation of

meat extracts, edible fats, tallow, tankage, fertilizers, wool, and other by-products. A. E. STEVENSON

FOOD ANALYSIS AND NUTRITION

(*See also numbers 151, 154, 164, 181, 227, 235, 236, 246, 247 and 272*)

275. Adulterated fruit pulp. E. FEDER. *Z. Nahr. Genussm.* 43, 199-201 (1921).—Beet pulp is the most common adulterant. Methods for its detection are reviewed. R. H. L.

276. The detection of apple juice in "pure fruit" jams. C. F. MUTTELET. *Ann. fals.* 15, 196-200(1922).—The detection of apple juice in jams depends on the determination of malic acid as apple, pear and quince juices contain this acid while the other fruit juices used in jams contain citric acid.
F. W. TANNER

277. The determination of the amino acid nitrogen in foods and condiments by the quantitative colorimetric ninhydrin (triketohydrindene) method. H. RIFFART. *Z. Nahr. Genussm.* 44, 225-39(1922).—Detailed methods for the determination are given.

278. A method of detecting biochemical reactions in various fluids by means of aniline dyes. E. W. HAMMOND *Can. Chem. Met.* Mar., p. 58(1922).—Aniline dyes reducible by certain enzymes were used to indicate the sterility of milk as well as to distinguish between different sugars, proteids and peptones. H. H. HOWRY

279. A very sensitive test for copper; the reaction of Kastle-Meyer. P. THOMAS AND G. CARPENTER. *Compt. rend.* 173, 1082-5(1921), through *C. A.* 16, 538.—A colution of 2 g. phenolphthalein and 20 g. pure potassium hydroxide in 100 cc. of pure water will give a pink coloration with a solution containing 1 part copper per 100,000,000 of water. Distilled water that has passed through copper pipes must not be used in preparing the reagent. The reaction is useful for the colorimetric determination of copper in water.
W. T. H.

280. The presence of succinic and oxalic acids in currents. H. FRANZEN AND F. HELWERT. *Z. physiol. Chem.* 124, 65-74(1922).—Acid portion consists principally of citric acid, also malic, succinic and a trace of oxalic.
F. C. BLANCK

281. The acids of the cherry . H. FRANZEN AND F. HELWERT. *Z. psysiol. Chem.* 122, 46-85(1922).—Acids consist principally of malic acid, traces of oxalic, small amounts of succinic, citric, lactic and unsaturated acids.
F. C. BLANCK

282. Determination of the fat content of foods and soap. A simplified procedure. J. GROSSFELD. *Z. Nahr. Genussm.* 44, 193-203(1922), *Cf. C. A.* 17, 834.—The method proposed is somewhat similar to the Schmidt-Bonzynski method for cheese and the Roese-Gottlieb method for milk. Trichloro-ethylene is used as a solvent and reasons are given for its selection.
R. H. LUECK

283. The determination of formic acid in fruit juices. W. MULLER. *Mitt. Lebensm. Hyg.* 13, 320-2(1922).—Modification of official Swiss method for determination of formic acid. The test is applied directly to fruit juices. The method is not applicable to fruit syrups or other sugar-containing solutions. F. C. BLANCK

284. Method of determining hydrogen sulfide evolved by foods when cooked

at various temperatures. E. F. KOHMAN. *J. Ind. Eng. Chem.* 14, 527-529 (1922); *J. Soc. Chem. Ind.* 41, 780A (1922).

285. **Effect of use of different instruments in making microscopic examination for mold in tomato products.** B. J. HOWARD. *Canner,* Apr. 29, p. 43 (1922).

286. **Manganese in the vegetable kingdom.** GABRIEL, BERTRAND AND ROSENBLATT. *Ann. inst. Pasteur* 35, 815-9 (1921); cf. *C. A.* 15, 4020; 16, 1451; *C. A.* 16, 1795.—Manganese was found in all of 20 plants investigated.

287. **Estimation of peroxidase in milk.** F. E. RICE AND T. HANZANA. *J. Ind. Eng. Chem.* 14, 201-2 (1922); *Analyst* 47, 305 (1922).—A method proposed originally by Bach and Chodat (*Ber.* 37, 1342 (1904)) for the estimation of peroxidase in plant extracts is recommended. It depends on the oxidation of pyrogallol to insoluble purpurogallin by hydrogen peroxide, peroxidase acting as a catalyst in the reaction. Details of the method are given. F. J. DASHNER

288. **The refractometer and interferometer.** PAUL HIRSCH. *Z. Nahr. Genussm.* 43, 65-72 (1922), through *C. A.* 17, 2558.—The application of these instruments to problems in food and biological chemistry is discussed.
D. B. DILL

289. **Determination of sucrose in the presence of other sugars by means of alkaline earth by dioxides.** A. BEHRE AND A. DURING. *Z. Nahr. Genussm.* 44, 65-70 (1922).—A method is described whereby the sucrose in a mixture is determined polarimetrically after destroying invert sugar and lactose by heating with calcium hydroxide. The latter does not decompose the sucrose.
R. H. L.

290. **Apparatus for measuring the hydrogen ion concentration of a solution. Application to the detection of mineral acid in vinegar.** A. KLING, A. AND A. LASSIEUR. *Compt. rend.* 174, 165-168 (1922); *J. Soc. Chem. Ind.* 41, 153A (1922).

291. **Research in chemistry as related to medicine.** R. H. CHITTENDEN. *J. Am. Med. Assoc.* 78, 1273 (1922).—Includes brief statement of relation of vitamins to deficiency diseases. H. M. L.

292. **Present status of our knowledge of the vitamins and its application to the dietary.** H. C. SHERMAN, C. E. A. WINSLOW, E. L. FISK, I. GREENWALD, T. P. B JONES. *Am. J. Pub. Health* 12, 908-15 (1922).—The destruction of the antiscorbutic vitamin (vitamin C) is increased both with the time and with the temperature of heating. It is the more readily destroyed under oxidizing conditions, and in neutral or in alkaline, rather than in acid, media. The general question as to whether or not canned foods contain enough vitamin C cannot be answered at present. Canned meat and canned beans contain practically none; canned tomatoes ad sweetened condensed milk contain liberal supplies. Vitamins A and B are also discussed. C. O. BALL

293. **The relation of photosynthesis to the production of vitamin A in plants.** J. WALTER WILSON. *J. Biol. Chem.* 51, 455-9 (1922).—Wheat seeds were sprouted in wooden trays on moist paper, one lot in the dark room and another in the sunlight. When the sprouts were from 2 to 3 inches high, they were cut off close to the seeds, dried in a current of air at about 60° C., and ground into fine powder. Either etiolated or green wheat sprouts furnish an adequate amount of vitamin A when the dried sprouts make up 5% of the diet of white rats. Inasmuch as this proportion of sprouts represents a quantity of seeds which, if included in the diet, would be inadequate as a

source of this vitamin, the conclusion is drawn that vitamin A is produced in the growing plant with or without any accompanying photosynthesis.

E. F. KOHMAN

294. Origin of vitamin A. *Editorial, J. Am. Med. Assoc.* 78, 352(1922).—The occurrence of vitamin A in green tissues of plants at certain stages of development. H. M. L.

295. Distribution of vitamin B in some vegetable foods. T. B. OSBORNE AND L. B. MENDEL. *J. Am. Med. Assoc.* 78, 1121(1922).—Feeding tests with rats indicate that asparagus, celery, dandelion, lettuce and parsley contain considerable vitamin B. H. M. L.

296. The influence of the diet of the cow upon the quantity of vitamins A and B in the milk. CORNELIA KENNEDY AND R. A. DUTCHER. *J. Biol. Chem.* 50, 339-59(1922).—Two types of milk, one produced on a ration typical of that used on some farms during the winter season and known to be deficient in its vitamin content, and a second representing that produced on a ration carrying ample amounts of vitamins A and B, have been used in this investigation. The importance of feeding the cow a ration adequate as to its vitamin content is demonstrated. The presence of vitamins A and B in cow's milk is entirely dependent upon their occurrence in the ration. Stall fed cows will produce a milk rich in vitamins provided their ration consists of a proper combination of grains and leafy foods. A vitamin-rich milk is not necessarily correlated with access to pasturage. The effect of the vitamin is not necessarily one of appetite stimulation but rather a stimulation of metabolic processes which promote growth. E. F. KOHMAN

297. Further observations on the occurrence of the fat-soluble vitamin with yellow plant pigments. H. STEENBOCK AND MARIANA T. SELL. *J. Biol. Chem.* 51, 63-76(1922).—Data are presented which further emphasize the fact that the fat-soluble vitamin often occurs most prominently where there are found the largest amounts of certain yellow pigments. White sweet potatoes and white carrots were found to contain little fat-soluble vitamin which stands in marked contrast to our observations on the yellow pigmented varieties. The tops of white carrot roots, slightly pigmented with chlorophyll and containing a small amount of yellow pigment were found richer in fat-soluble vitamin than the bottoms containing only one-half as much pigment. Green cabbage leaves taken from the heart of cabbage plants which failed to "head" were found much richer in fat-soluble vitamin than white cabbage leaves in the head. The latter contained only one-tenth as much yellow pigment. E. F. KOHMAN

298. An experimental demonstration of the existence of a vitamin which promotes calcium deposition. E. V. MCCOLLUM, NINA SIMMONDS, J. ERNESTINE BECKER, AND P. G. SHIPLEY. *J. Biol. Chem.* 53, 293-312(1922).—A fourth vitamin is discovered whose specific property is to regulate the metabolism of the bones and causes the deposition of calcium in the bones of rachitic rats. This is especially abundant in cod liver oil, shark liver oil, burbot liver oil, but is not the same as the fat-soluble A in these fats. Coconut oil contains no vitamin A but contains this new vitamin. Butter fat contains vitamin A in abundance but only small amounts of the new vitamin. When cod liver oil is oxidized 12 to 20 hours it loses its ability to cure xerophthalmia but retains the vitamin which causes deposition of calcium in the bones.

E. F. KOHMAN

299. Destruction of vitamins by cooking. *Canner*, June 17, p. 37(1922).—An answer to criticism of high temperature cooking.

300. Methods of vitamin investigation. ELIZABETH W. MILLER. *J. Home Econ.* Aug., pp. 364-8 (1922).

301. Our knowledge of vitamins. *J. Am. Med. Assoc.* 78, 734 (1922).—A normal adult living on ordinary diet containing a reasonable proportion of fresh vegetables is certain of obtaining a plentiful supply of vitamins.

302. Vitamin theories. *J. Am. Med. Assoc.* 79, 381 (1922).—Editorial regarding various hypotheses as to function of vitamins. H. M. L.

303. Experimental studies with proprietary vitamin products. J. H. HESS, J. J. MOORE, AND J. K. CALVIN. *J. Am. Med. Assoc.* 78, 1441 (1922).—A test of 3 products for vitamins B and C showed claims to be exaggerated. Authors advise proper selection of foods as best method of securing necessary vitamins.

304. The antiscorbutic vitamin. A study of its solubility from desiccated orange juice. E. B. HART, H. STEENBOCK AND S. LEPKOVSKY. *J. Biol. Chem.* 52, 241-50 (1922).

305. Antiscorbutic property of foods. *J. Am. Med. Assoc.* 78, 1461 (1922).—Editorial discussion of distribution of vitamin C and its preservation. H. M. L.

306. Some observations on dehydrated food products. K. GEORGE FALK AND GRACE M. MCGUIRE. *Am. Food J.* 16, No. 10, 16-7 (1921); cf. *C. A.* 15, 127, through *C. A.* 16, 128.—The effect of dehydration on the vitamin content of foods, especially the advantages of the vacuum method, is discussed particularly with respect to the *drying of bananas.* H. A. LEPPER

307. Antiscorbutic value of dehydrated fruits. P. F. ECKMAN. *J. Am. Med. Assoc.* 78, 635 (1922).—Only dried peaches contained sufficient proportion of vitamin C to maintain life of experimental animals. H. M. L.

308. Vitamins in canned foods. E. F. KOHMAN. *Research Laboratory, National Canners Assoc., Bull.* 19-L, May, 1922.—The bulletin gives in tabular form the results of all published experimental work that could be found regarding the influence of heat and oxidation on vitamins in foods, also the literature of that phase of the question. The literature appears to be sufficient to warrant the conclusion that vitamins A and B are not appreciably affected by the heat applied in the processing of canned foods. "From the experimental evidence, all available canned foods are believed to be practically as rich in vitamins A and B as the corresponding raw product." Vitamin C is destroyed by heating in the presence of oxygen, but in the absence of oxygen this destruction is very much less. Air is excluded as far as possible in processing canned foods, and the slight amount of scientific information available on that phase of the subject indicates that the vitamin C content of canned foods is no less than that of the same kinds of foods obtained by cooking the raw products by ordinary kitchen methods.

309. Destructive action of heat on vitamins. G. PETRAGNANI. *Rend. d. adunanze d. Accad. med.-fis. fiorentina*: *Sperimentale* 75, 403-9 (1921), through *C. A.* 16, 1453.—Having previously shown that natural immunity is destroyed by feeding material devitaminized by moist heat, experiments were undertaken to determine more precisely the conditions under which the vitamins are destroyed, with the idea that light might be thrown thereby on human resistance to infection. While the results with dry heat were not entirely conclusive it is shown that moisture contributes largely to the inactivating effect of heat. M. HEIDELBERGER

310. Nutritive value of various salad oils. B. N. BALDWIN. *Am. Food J.*, Mar., p. 29 (1922).

311. **Sound Food.** Charles Thom. *Canner*, Dec. 23, p. 4 (1922).

312. **The comparative efficiency of timothy hay, alfalfa hay, and timothy hay plus calcium phosphate (steamed bone meal) in maintaining calcium and phosphorus equilibrium in milking cows.** E. B. Hart, H. Steenbock, C. A. Hoppert, and R. M. Bethke. *J. Biol. Chem.* 54, 75-89 (1922).—Alfalfa hay cured in the windrow with exposure to air and light four days did not secure a positive balance of calcium and phosphorus when fed with grains and corn silage while alfalfa hay cured under caps did. E. F. Kohman

313. **Newer aspects of the rickets problem.** A. F. Hess. *J. Am. Med. Assoc.* 78, 1177-83 (1922).—Theories are advanced regarding effect of diet, vitamins, etc., on rickets. H. M. L.

314. **Faulty food in relation to gastro-intestinal disorders.** R. McCarrison. *J. Am. Med. Assoc.* 78, 1 (1922).—The article contrasts prevalence of digestive disturbances among civilized races as compared with uncivilized. The relation of faulty foods and vitamin deficiency to such disturbances is discussed. H. M. L.

315. **Use of vegetables in diabetic diet.** H. M. Croll. *J. Am. Med. Assoc.* 79, 1424 (1922).— Effect of cooking on carbohydrate and vitamin content of vegetables.

316. **The mineral metabolism of the milch cow.** E. B. Forbes, J. A. Schulz, C. H. Hunt, A. R. Winter, and R. F. Remler. *J. Biol. Chem.* 52, 281-315 (1922).—This paper contains much valuable data on the metabolism and nutrition of the milch cow. Some of the data also bears upon the composition of milk. The milk toward the end of the period of lactation was found to differ from that of the middle of this period by being richer in nitrogen and in all of the minerals except potassium, which was distinctly low. Sodium and chlorine were in greatest excess. E. F. Kohman

317. **Observations on the presence of the antineuritic substance, water-soluble B, in chlorophyll-free plants.** C. R. Orton, E. V. McCollum and Nina Simmonds. *J. Biol. Chem.* 53, 1-11 (1922).—Etiolated leaves appear to be as effective sources of water-soluble B as are leaves in which chlorophyll has been caused to develop as the result of illumination. Onion roots contain no cloroplast, and they also contain vitamin B in about the amount found in cereal grains. Mushrooms are an excellent source of water-soluble B. E. F. Kohman

318. **Preliminary report on the effect of cooking foods in the pressure cooker on the biological value of such foods.** Louise Stanley and Ruth Whipple. *J. Home Econ.* 13, 446 (1921), through *C. A.* 16, 1263.—Results with rats so far indicate that food cooked under various pressures is less efficient biologically than the same food raw. H. N. E.

319. **Dietary factors influencing calcium assimilation.** E. B. Hart, H. Steenbock, and C. A. Hoppert. *J. Biol. Chem.* 53, 21-30 (1922).—Good second cutting alfalfa hay cured under caps caused a positive calcium balance, but fresh green alfalfa resulted in even more calcium being stored. The milk, when dry hay was fed, was coagulable at 136° C. but this coagulation could be prevented by the addition of calcium salts. When green alfalfa hay was fed, the milk also coagulated at 136° C. but calcium salts lowered the coagulation temperature whereas citrates raised it. E. F. Kohman

320. **Calcium and phosphorus metabolism in childhood.** H. C. Sherman and Edith Hawley. *J. Biol. Chem.* 53, 375-99 (1922).—Children from 3 to 13 years old assimilate the maximum amount of calcium when their diet in-

cludes about one quart of milk per day. They cannot utilize the calcium of vegetables as well as that in milk and when vegetables replace some of that amount of milk the calcium assimilated drops even though the intake remained the same. E. F. KOHMAN

321. **The utilization of calcium and phosphorus of vegetables by man.** N. R. BLATHERWICK AND M. LOUISA LONG. *J. Biol. Chem.* 52, 125-31 (1922).—Data are presented which indicate that calcium and phosphorus derived from vegetables are capable of meeting the maintenance needs of man.

322. **Digestibility of raw rice, arrowroot, canna, cassava, taro, tree-fern, and potato starches.** C. F. LANGWORTHY AND HARRY J. DEUEL, JR. *J. Biol. Chem.* 52, 251-61 (1922).

323. **Do we digest all fat equally well?** J. J. WILLAMAN. *Am. Food J.*, Jan., p. 15 (1922).—The digestibility of all fats is very high, from 92 to 97%, with very few exceptions. As the melting point becomes higher, however, there is a decrease in digestibility. None of the oils examined, some sixty varieties, appeared to effect the utilization of the other constituents of the diet. It was likewise shown that in no case was more than a slight laxative effect noted from the ingestion of the fat. The experiments show that practically all edible fats are of equal dietary value, when considered from the standpoint of available energy. Liberal quantities of most of them can be taken without any attendant physiological disturbances. J. P. STREET

BACTERIOLOGY

(*See also numbers 148, 156, 171, 172, 177, 182, and 273*)

A—Technical

324. **Bacteria and molds in dehydrated vegetables.** S. C. PRESCOTT, P. F. NICHOLS AND R. POWERS. *Am. Food J.*, June, p. 11 (1922).—Bacteria and molds are normally present in very large numbers in commercially dehydrated vegetables. If such products are to be held in storage for a period of months, containers impervious to water must be used. Tin cans with friction tops are recommended as rendering perfect protection against absorption of moisture. Paper cartons, paraffined and unparaffined, were suitable under reasonably dry storage conditions, but did not prevent spoilage in the presence of much humidity. JOHN P. STREET

325. **Studies of the bacterial flora of home-canned vegetables.** H. L. LANG. *J. Home Econ.* 13, 448-9 (1922), through *C. A.* 16, 764.

326. **Studies on thermal death time of C. Botulinum.** E. C. DICKSON, G. S. BURKE, D. BECK, J. JOHNSTON, AND H. KING. *J. Am. Med. Assoc.* 79, 1239 (1922).—Reports on maximum survival time of organism at various temperatures. H. M. L.

327. **The heat resistance of the spores of B. botulinus and allied anaerobes XI.** J. R. ESTY AND K. F. MEYER. *J. Infectious Diseases* 31, 650 (1922).—A brief analysis of the results obtained on heating over 1800 spore suspensions of B. botulinus and allied anaerobes at different temperatures is made. In this work such factors as the maximum resistance to heat, the effect of numbers, age, drying, hydrogen ion concentration of different solutions, salt of different concentration, and the resistance in food juices are considered. The resistance of the spores of B. botulinus as found in naturally or artificially contaminated soil was determined. Subcultures from heated spore suspensions have germinated after an incubation of 378 days at 36-47° C. The heat

resistance of B. botulinus in the juices of 17 varieties of canned food showed a variation from less than 10 minutes to 230 minutes at 100° C. with the suspension employed. J. R. ESTY

328. The thermal death point of the spores of B. botulinus in canned foods. H. WEISS. *J. Infectious Diseases* 29, 352-68(1921); through *Abstracts Bact.* 6, 62(1922).—The thermal death point varies with the hydrogen ion concentration, with the consistency of the food, and the concentration of syrup, if present. The more acid foods, such as canned fruits, require a maximum of 50 minutes at 100° C., 30 minutes at 105° C. and 15 minutes at 110° C. Vegetables which are less acid, require a longer time, 90 to 180 minutes at 100° C., 30 to 70 minutes at 105° C., and 10 to 20 minutes at 110° C. The length of time also varies, of course, with the size of the can, the consistency of the pack, and the amount of fluid present. J. R. ESTY

329. An experimental study of the methods available for the enrichment, demonstration and isolation of B. botulinus in specimens of soil and its products, in suspected food, in clinical and in necropsy material. I. B. J. DUBOVSKY AND K. F. MEYER. *J. Infectious Diseases* 31, 501(1922).—The methods employed for the enrichment and demonstration of B. botulinus in specimens of soil and its products and the methods applicable for the examination of suspected food, clinical and necropsy material are described in detail. Such factors as the composition of the medium, the preparation and heating of the samples, the period of incubation and storage, the identification of the toxin and the isolation of the organism from toxic enrichment cultures are discussed. J. R. ESTY

330. Clostridium botulinum. FRED W. TANNER AND GAIL M. DACK. *J. Infectious Diseases* 31, 92(1922).—The results reported in this work show that different strains of Clostridium botulinum vary in their resistance to dry heat due probably to inherent characteristics and in a large measure to the age of the cultures used. At 110° C. the time of survival averaged beyond 120 minutes. At 140° C. the variation was between 60 minutes and 15 minutes, while at 160° C. and 180° C. the times of survival were short, between 5 and 15 minutes. The modern methods of dry heat sterilization seem, then, to be adequate for sterilizing apparatus which has been used for cultivating Clostridium botulinum. Young spores are more resistant to dry heat than old ones. The spores of Clostridium botulinum have also been found to be commonly present in nature. Eleven of 73 soil samples and three specimens of hog feces contained them. Three specimens of cow feces did not contain them although one sample of sewage showed the presence of this organism.

J. R. ESTY.

331. The precipitation of botulinus toxin with alcohol. J. BRONFENBRENNER AND M. J. SCHLESINGER. *Proc. Soc. Exptl. Biol. Med.* 18, 304-5(1921), *C. A.* 16, 1106.—The administration of 6 cc. of 30% alcohol and a lethal dose of botulinus toxin by mouth to guinea pigs did not result in the death of the animals as did the giving of toxin alone.

332. Botulism; a study of the action of the toxin of B. botulinus upon the living tissues. ERNEST C. DICKSON AND RICHARD SHAVKY. *Proc. Soc. Exptl. Biol. Med.* 18, 313(1921), *C. A.* 16, 1106.

333. Experimental botulism in dogs. R. GRAHAM AND S. ERIKSEN. *J. Infectious Diseases* 31, 402(1922).

334. A note on the presence of B. botulinus Type A in the excretions of

poliomyelitis patients. R. GRAHAM AND E. BARGER. *Univ. Ill. Bull., Urbana,* 19, pp. 23(1921), through *Abstracts Bact.* 6, 63(1922).

335. **B. botulinus: Relation of toxin production to temperature.** R. B. EDMONSON, L. T. GILTNER AND C. THOM. *Abstracts Bact.* 6, 23(1922).

336. **The logarithmic nature of thermal death time curves.** W. D. BIGELOW. *J. Infectious Diseases* 29, 528(1921), through *Abstracts Bact.* 6, 240(1922).—In this article thermal death time curves determined for various bacterial spores at specified temperatures are plotted on semilog paper. These curves are mainly straight lines and for different organisms the lines are very nearly parallel. A discussion of the charts are included in the text. J. R. ESTY

337. **Studies in bacterial metabolism, B. botulinus.** A. O. KENDALL, A. A. DAY AND A. W. WALKER. *J. Infectious Diseases* 30, 177(1922).

338. **Some strict thermophilic anaerobic bacteria.** R. VEILLON. *Ann. inst. Pasteur* 36, 422-439(1922).—Strictly thermophilic or, more correctly, thermotolerant bacteria exist in nature. Veillon isolated three such species, all of which are characterized with some detail. They developed btween 20° and 58° C. F. W. TANNER

339. **Thermophilic bacteria in canning.** R. E. BUCHANAN. *Canner,* May 27, p. 27(1922).

340. **Studies on thermophilic bacteria, I. Aerobic thermophilic bacteria from water.** LETHE E. MORRISON AND FRED W. TANNER. *J. Bact.* 7, 343-66(1922).—A study of thermophilic bacteria in 52 samples of water, 85% of which were condemned because of presence of B. coli of fecal origin, shows all to be strict aerobes. (Abstractor's note. They are therefore probably of little significance to the canning industry as a source of thermophilic bacterial contamination.) L. V. BURTON

341. **Influence of vacuum upon growth of some aerobic spore-bearing bacteria.** L. D. BUSHNELL. *J. Bact.* 7, 283-300(1922).—B. mesentericus predominates over B. subtilis among living organisms found in non-sterile canned foods because of its ability to grow with less free oxygen available. The acidity of certain food products functions toward "keeping" by virtue of lowering the thermal death point of organisms rather than by inhibiting growth. The amount of vacuum during the heating process does not influence the thermal death point. All experiments were carried out in glassware under laboratory conditions. L. V. BURTON

342. **Salt effect in bacterial growth. I. Preliminary paper.** G. E. HOLM AND J. M. SHERMAN. *J. Bact.* 6, 511-19(1921); through *C. A.* 16, 947.—The growth of B. coli in 1% peptone medium is accelerated or retarded by different salts in low molecular concentration. The salt effects at various hydrogen ion concentrations vary greatly. Those salts which accelerate growth seem to widen the hydrogen ion range for optimum growth, while those which retard growth seem to narrow the limit for optimum activity. Cations and anions are both effective. JOHN T. MEYER

343. **Zinc poisoning.** LONDON CORRESPONDENT. *J. Am. Med. Assoc.* 80, 707(1923).—An outbreak of alleged zinc poisoning involving 200 persons near London was attributed to cooking apples in galvanized vessels. Analysis of the stewed apples showed 7 grains zinc per pound (1 gram per kg.). H. M. LOOMIS

344. **Preliminary note on a toxin producing anaerobe isolated from the larvae of Lucilia Caeser.** IDA A. BENGTSON. *Pub. Health Rep., Wash.,* 37 164-170(1922).—An anaerobic organism has been isolated from larvæ of the

green fly, *Lucilia Caesar*, which produces a soluble toxin affecting animals in a manner similar to the toxin of *Clostridium Botulinum*, but which fails to be neutralized by antitoxins of type A and B of the latter organism. The organism differs from the strains of *C. botulinum*, isolated in this country in several respects. It is non-proteolytic, grows less readily in the ordinary culture media, and is not very resistant to heat. It has less tendency to produce gas in broth and agar media, but produces a large amount of gas in meat media with the development of only slight turbidity. The filtrate of cultures has been found toxic to guinea pigs, rabbits, rats, mice, monkeys, pigeons and chickens. The two latter species are less susceptible than the others, relatively large doses being required to produce any effect. The relation of the organism to limberneck of chickens has not yet been determined.

I. A. B.

B—Public Health

345. The distribution of the spores of B. botulinus in the United States IV. K. F. MEYER AND B. J. DUBOVSKY. *J. Infectious Diseases* 31, 559 (1922).—A general survey of every state of the United States except Virginia was made to determine the distribution of the spores of B. botulinus in nature. An examination of 1538 soil, vegetable, feed and manure specimens shows that B. botulinus is a common soil anaerobe of the Western States of the Cordilleran system. It is less frequently encountered in the Atlantic States, and is relatively rare in the Middle States, the Great Plains and the Mississippi Valley. B. botulinus, type A, predominates in the soil of the Western States inclusive of the great plains while type B is more frequently associated with the soil in the Mississippi Valley and Great Lakes region as well as the Atlantic States. From a practical standpoint B. botulinus is ubiquitous and this survey shows that heat resistant spores may be found anywhere and at any time. J. R. ESTY

346. The distribution of spores of B. botulinus in the soil of a restricted area in California. III. G. E. COLEMAN. *J. Infectious Diseases* 31, 556 (1922).—Samples of cultivated soils of a narrow strip of coast line in Santa Barbara Co., Cal., are heavily contaminated with the spores of B. botulinus, type A, and also those of B. tetani. Virgin soil samples in the same vicinity contain spores of B. botulinus, type A. J. R. ESTY

347. The distribution of the spores of B. botulinus in Calfornia II. K. F. MEYER AND B. J. DUBOVSKY. *J. Infectious Diseases* 31, 541 (1922).—Spores of B. botulinus were present in approximately 30% of 624 specimens of soil, vegetables, fruit, feeds, manure and sewage collected in 36 counties of Cal. Of the identified toxins in these toxic cultures, 74.8% were neutralized by a type A, and 22.1% by a type B, and 3.1% by a polyvalent antitoxin. Vegetables and fruits bought in various cities and towns of Cal. carry the spores of B. botulinus. These results definitely indicate that the spores of B. botulinus are widely distributed in nature. J. R. ESTY

348. The distribution of the spores of B. botulinus in the territory of Alaska and the Dominion of Canada. V. B. J. DUBOVSKY AND K. F. MEYER. *J. Infectious Diseases* 31, 595 (1922).—B. botulinus, type A, and occasionally type B, has been demonstrated in moraine, glacier and mountain soil collected around Lake Louise in the Canadian Rockies. It is also found in soil samples obtained from the provinces of Prince Edward Island, Nova Scotia, Quebec, Ontario and British Columbia, but cultures from coast land soil of the Aleutian Archipelago were negative. J. R. ESTY

349. **The occurrence of the spores of B. botulinus in the Hawaiian Islands and China. VII.** P. SCHOENHOLZ AND K. F. MEYER. *J. Infectious Diseases* 31, 610(1922).—B. botulinus, type B, is frequently found in the soils obtained from the Island of Oahu, in the territory of Hawaii, and from the provinces of Chilili and Shansi, in China. Type A has been found only in two Hawaiian and in one Chinese soil specimen. J. R. ESTY

350. **The occurrence of the spores of B. botulinus in Belgium, Denmark, England, The Netherlands and Switzerland. VI.** K. F. MEYER AND B. J. DUBOVSKY. *J. Infectious Diseases* 31, 600(1922).—B. botulinus, type B, has been demonstrated in soil and vegetable specimens collected in Belgium, Denmark, England, The Netherlands and Switzerland. Type A has not been encountered in these samples. The spores, although widely distributed, are neither numerous nor heat resistant. J. R. ESTY

351. **The occurrence of B. tetani in soil and on vegetables. VIII.** B. J. DUBOVSKY AND K. F. MEYER. *J. Infectious Diseases* 31, 614(1922).—The spores of B. tetani are frequently encountered in well manured, cultivated or garden soil, and on vegetables obtained from several states east of the Mississippi, Switzerland and China. In the United States even virgin soil has yielded cultures of B. tetani. The soil of the Western states is relatively free from this anaerobe. J. R. ESTY

352. **The epidemiology of botulism.** J. C. GEIGER, E. C. DICKSON AND K. F. MEYER. U. S. Pub. Health Serv., *Pub. Health Bull.* No. 127, 119(1922).—The bulletin is a report of extended investigations on the epidemiology of botulism. The subject is considered under the following headings: Introduction; General considerations; Human botulism in California; Human botulism in the State of Washington; Human botulism in the United States and Canada, exclusive of the States of California and Washington; Botulism in domestic animals; Features of botulism; General discussion; Conclusions; Summary. A bibliography is appended.

353. **Report of outbreak of botulism.** C. G. BEALL. *J. Am. Med. Assoc.* 79, 381(1922).—Report of outbreak at Kendallville, Ind., involving 9 persons with 4 fatalities, attributed to commercially canned spinach. H. M. L.

354. **Death from food poisoning due to B. botulinus.** J. B. CUTTER. *J. Am. Med. Assoc.* 79, 825(1922).—Two cases, one fatal, are reported as due to homemade chili sauce. H. M. L.

355. **Outbreak of botulism at Cambridge, Idaho.** R. T. WHITEMAN AND E. A. WILKINSON. *J. Am. Med. Assoc.* 78, 1278(1922).—Account of nine cases, six fatal are attributed to home canned greens. H. M. L.

356. **Factors in causation of botulism.** *J. Am. Med. Assoc.* 79, 42(1922).—Editorial discussing effect of nature of food, heat penetration, and measures taken to avoid further outbreaks. H. M. L.

357. **What every canner should know.** Report of the Research Committee to the Board of Directors, *National Canners Assoc., Bull.* 89A, Oct. 12, 1922.—This bulletin gives a nontechnical statement of the results obtained in a series of studies of botulinus, recently conducted in several university medical schools with funds provided by the National Canners Association. It also interprets these results into the conditions of the canning industry.

358. **England's botulism scare allayed by our investigation.** *Canner*, Nov. 11, p. 31(1922).—A story of Dr. Meyer's visit to England and Scotland.

359. **Clostridium botulinum. II. Presence in human alimentary tract.** F. W. TANNER AND G. M. DACK. *J. Am. Med. Assoc.* 79, 132(1922).—Results of examination of specimens from 15 human beings are given. H. M. L.

360. **Botulism from the regulatory viewpoint.** CHARLES THOM. *Am. J. Pub. Health* 12, 49-53(1922).—The characteristics of B. botulinus relative to conditions found in canned foods are discussed. The resistance to heat varies between different strains, and is influenced by the hydrogen ion concentration of the medium. Five minutes at 85° C. throughout the food is sufficient to destroy the toxin. B. botulinus is essentially anaerobic in character and is rarely found unassociated with other species of nontoxic spoilage producing organisms. C. O. BALL

361. **The relation of contaminated rations to the presense of C. botulinum in the milk of lactating animals.** ROBERT GRAHAM, HERMAN SCHWARZE, I. B. BOUGHTON. *Am. J. Pub. Health* 12, 659-65(1922).

362. **Report on an outbreak of botulism.** CHARLES G. BEALL. *J. Am. Med. Assoc.* 79, 38(1922), through *Abstracts Bact.* 6, 416(1922).

363. **Botulism in its relation to anti-hog cholera serum and hog-cholera virus.** E. A. CAHILL, H. W. JAKEMAN AND T. W. MUNCE. *J. Am. Vet. Med. Assoc.* 60, 702-16(1922), *Abstracts Bact.* 6, 311(1922).

364. **The pathogenicity of B. botulinus.** PAUL F. ORR. *J. Infectious Diseases* 30, 118-27(1922), *Abstracts Bact.* 6, 242(1922).—The optimum temperature for toxin production and growth is 37° C. B. botulinus was recovered from the internal organs of guinea pigs after feeding, or the injection with toxic cultures or washed spores. The organism grows and produces toxin in guinea pigs. Experimental botulism can be produced in laboratory animals by the feeding or injection of massive quantities of toxin-free spores of B. botulinus. J. R. ESTY

365. **Some observation on the pathogenicity of B. botulinus. X.** G. E. COLEMAN AND K. F. MEYER. *J. Infectious Diseases* 31, 622(1922).—Massive doses of toxin-free spores of B. botulinus are pathogenic when introduced into the animal body. These spores and the vegetative forms arising from them are rapidly disseminated throughout the tissues of the body. Toxin-free spores of B. botulinus germinate, and the vegetative forms arising from this germination multiply and liberate toxin in the animal body. J. R. ESTY

366. **Some of the factors contributing to toxicity of botulinus toxin by mouth.** J. BRONFENBRENNER AND M. J. SCHLESINGER. *J. Am. Med. Assoc.* 78, 1519(1922), through *Abstracts Bact.* 6, 416(1922).—The filtrate from botulinus cultures contains a specific botulinus toxin and nontoxic substances which are capable of increasing the permeability of the intestine so as to permit absorption of the toxin. The toxin is resistant to the hydrogen ion concentration and the enzymes of the digestive tract. The toxin increases in potency when it encounters a hydrogen ion concentration similar to that present in the stomach during digestion. Since the toxin is neutralized in the small intestine it is probable that the toxin is absorbed from the stomach and upper duodenum. J. R. ESTY

367. **Scientific research in the canning industry.** R. I. BENTLEY. *Trade,* Jan. 30, pp. 23-5(1922).—An outline of the research which has been done on botulism. The importance of continuing this work is emphasized.
C. O. BALL

368. **Larvae of the house fly (Musca domestica) in relation to the dissemination of B. botulinus and botulinus toxin.** R. GRAHAM, R. D. GLASGOW AND E. BARGER. *Abstracts Bact.* 6, 20(1922).

369. **Canning powders useless to destroy B. botulinus.** *Canner,* Sept. 16, p. 27(1922).

370. Development of paratyphoid-enteritidis group in various foodstuffs. S. A. KOSER. *J. Infectious Diseases* 31, 79(1922).—Members of this group multiply readily in the liquor of tomatoes, spinach, string beans, corn, peas, and evaported milk. No growth occurred in sauerkraut, and in the juices of pineapples, raspberries, cherries and pears destruction took place rapidly. In several meat products, namely, corned beef, cooked ground meat and canned red salmon, the organisms of the Gaertner group exhibited a marked ability to spread from the point of inoculation throughout the foodstuffs when optimum temperature conditions were employed. Growth is not usually accompanied by visible alteration or spoilage in the foodstuffs tested. In this work, for the most part, the strain of B. enteritidis isolated by Savage and Forbes from a human food poisoning outbreak at Brighton, England, and strain "rabbit 1371," obtained by Litch and Meyer during the course of an outbreak among rabbits, were used. Other organisms of this group behaved in a similar way. Specimens were held at 37° C., 20° C., and in an icebox 6-9° C. from 24 hours to seven days, and growth determined by plating on dextrose litmus agar.

J. R. ESTY

371. Returned spoiled foods. *U. S. Dept. Agr., Bureau Chem., Service and Regulatory Announcements*, Chem. 28, item 381.—The practice has long existed in the distributing trade of securing a refund for foods that become spoiled, particularly canned foods, by returning them to the sources from which they were obtained. Frequently this material finds its way back into trade channels and is again offered for consumption. Spoiled foods are potentially dangerous to the consumer and should be destroyed immediately on discovery of their condition. It is considered necessary to the protection of the public that hereafter seizure proceedings be instituted against interstate shipments of decomposed foods, even though such shipments be made with the sole intent of securing a refund for spoilage. The shipper of such foods will be liable to criminal prosecution.

372. A paratyphoid epidemic in a herd of sheep, causing a certain wide spread infection through meat poisoning in Ueberruhr (Dist. of Essen). HAYO, BRUNS AND GASTERS. *Z. f. Hyg. u. Infektionskrankh.* Leipz. 90, 263-80(1920).—Lambs infected with paratyphoid had been killed and the meat eaten. As a result there were 2000 illnesses, with 40-50 serious cases and 3 deaths (in old people). The organism was identified.

J. R. ESTY

373. Paratyphoid Fever. Report of an outbreak in Cascade, Montana, caused by head cheese. F. T. FOARD AND T. F. WALKER. *Pub. Health Reports* 36, 2095-106(1921), *Abstracts Bact.* 6, 63(1922).

374. Food infections. M. J. ROSENAU AND H. WEISS. *J. Am. Med. Assoc.* 77, 1948(1921), through *Abstracts Bact.* 6, 63(1922).—Bread pudding which had a peculiar taste was responsible for a particular outbreak of food infection.

J. R. ESTY

375. Poison in tinned food. *Brit. Focd J.* 24, 113(1922).—The cause of poisoning of six Middlesborough people was solved when it was announced by Dr. Savage of the Ministry of Health that the tinned meat which these people had consumed contained undestroyed toxic bodies. The meat was infected with the salmonella group probably from a diseased animal. Local traders were not to blame.

EDWIN LEFEVRE

376. Bacterial food poisoning. *Brit. Food J.* 24, 33(1922).—Report is made of an extensive outbreak of bacterial food infection at Clitheroe, England. There were 54 known cases in 15 families. The cause of infection was found to be from eating potted meat. The organism responsible was B. aertrycke which was isolated from the meat, also from a sample of feces from one of the cases during acute stage and from the spleen, liver, and kidney of one of the fatal cases. EDWIN LEFEVRE

377. Food poisoning. *Brit. Food J.* 24, 83(1922).

378. Report of an outbreak of bacterial food poisoning. W. D. O'KELLY. *J. Hyg.* 21, 113-25(1922).—Description of an outbreak of food poisoning which occurred during October, 1921, at an Institution for boys near Dublin, Ireland, resulting in one hundred and forty-eight cases of illness, no deaths. Symptoms were headache, nausea, vomiting, abdominal pain, diarrhea, and a temperature in some instances reaching 104° F. All were convalescent in from 24 hours to 4 or 5 days. The outbreak was attributed to infected raw milk though the evidence for this assumption is not conclusive. B. enteritidis (*Gaertner*) was isolated from three of four specimens of feces from those taken ill. Several, though not all, of the samples of sera taken from the patients agglutinated B. enteritidis in low dilution. A case of gastro-enteritia had occurred in an employee of the institution some time previous to the outbreak and the milk is supposed to have become contaminated through this source. S. A. KOSER

379. Studies on the paratyphoid-enteritidis group. VII. Enteric infection ("food poisoning") due to tapioca pudding contaminated with B. cholerae suis (B. suipestifer). C. KRUMWIEDE, D. J. PROVOST, AND G. M. COOPER. *J. Med. Research* 43, 53-59(1922).—Outbreak of "food poisoning" occurred in a family in August, 1921. There were four cases of illness with one death. B. suipestifer was isolated from the liver at autopsy of the fatal case and also from a tapioca pudding which had been consumed by the family. Bacteriological examination of dry tapioca, which was used in preparing the pudding, failed to reveal presence of the organism. The source of the B. suipestifer is supposed to have been from pork products which were apparently handled at the time of preparing the pudding. S. A. KOSER

380. Food poisoning and its prevention. CHARLES THOM. *Am. Food J.*, Nov., p. 15(1922).—So-called "food poisoning" of bacterial origin is divided into two groups, the first an acute gastro-intestinal disturbance with nausea, vomiting and purging as chief symptoms, commonly misnamed "ptomaine" poisoning; the second, disease of the central nervous system typified by botulism. The responsibility for these bacterial infections must be shared alike by the manufacturer, the food handler and the consumer. A summary of suggestions for the prevention of this form of poisoning follows: 1, food to be eaten raw should be fresh, clean, sound—free from stale odors, from slimy, rotting areas, from discolorations and from mold, and should be carefully washed in an abundance of bacteriologically clean water; 2, sound food freshly cooked does not cause food poisoning; 3, moist or soft cooked food if held more than a few hours should be kept in a good refrigerator. If such refrigeration is impossible, the food even though showing no sign of spoilage should be recooked before serving; 4, the frequency of enteric outbreaks and of botulism clearly points to a very general failure to appreciate the dangers of bacterially contaminated and spoiled food; 5, responsibility for eliminating spoiled food from human consumption rests equally upon the packer, the dealer and the person who prepares it for the table. J. P. STREET

381. Proper procedure for state officials in cases of food poisoning. S. J. CRUMBINE. *Am. Food J.*, Nov., p. 36(1922).—The fact is emphasized that a comparatively small percentage of food poisoning occurs from commercially canned foods; more often it will be found that such poisoning is the result of improper sterilization of the homemade or home-canned product.

J. P. STREET

382. Popular misconceptions on food poisoning. *Nation's Health* 4, 385 (1922).—It is a common human trait to trace back any gastro-enterologic disturbance to some food previously taken. It is usual to see acute appendicitis, gall bladders, or ulcers of the stomach, diagnosed by the patients as some form of food poisoning. It is possible even to encounter self-diagnosed cases of ptomaine poisoning, a disease which practically never exists, and that would better be entirely left out of the minds and thoughts of both physicians and patients. Food poisoning as such is extremely rare. Group poisoning sometimes occurs but even here extreme caution should be taken before asserting that any particular food is responsible for the outbreak. When individuals are affected unfavorably by certain foods, it is usually some fault of the individual and not the food. It is necessary therefore for both professional men, who are still willing to accept the patient's diagnosis of food poisoning, and for the individual himself, to assume that ptomaine does not exist and that the incidence of individual food poisoning is as rare an entity as is met with in medical practice. JOHN P. STREET

383. Toxicity of putrid food. WM. G. SAVAGE. *J. Hyg.* 20, 69-84 (1921), through *C. A.* 16, 272-3.—The mass action of putrefactive bacteria and their products is a minor if not a negligible factor in the production of toxic symptoms in man. Harmfulness from bad food is a matter of specific infection with particular pathogenic bacteria in all, or almost all cases.

JOHN T. MYERS

384. "Swells" must be carefully sorted out. *Trade*, May 29, p. 18 (1922).—A part of section 7 of the U. S. Food and Drugs Act is quoted and discussed, and ten rules are given, the observance of which will assist the canner to eliminate spoilage. C. O. BALL

385. Investigation of cases of illness alleged to be due to canned foods. *Trade*, Jan. 30, p. 10 (1922); *Canner*, Jan. 28, p. 29 (1922).—A condensed report of the investigation by the National Canners Association of 70 cases of illness said to be due to canned foods. C. O. BALL

386. Ptomaine poisoning only a myth. FRANK L. HEALY. *Scientific American*, through the *New York World*, Apr. 23, 1922; *Trade*, May 8, p. 34, (1922); *Canner*, May 13, p. 31 (1922).—Practically all cases of food poisoning, commonly called "ptomaine poisoning," may be attributed to one of the two following sources: (1) meat or milk derived from an animal suffering from a disease caused by one of the members of the Gaertner group of organisms, or (2) food which has become infected through certain animals or insects. Ptomaine poisoning, as such, does not exist. C. O. BALL

387. Detecting spoiled canned food. *Canner*, Aug. 5, p. 28 (1922); *American Grocer*, July 26, p. 6 (1922).

388. No ptomaines in canned foods. FRED J. HASKINS. *Trade*, Oct. 2, pp. 24-6 (1922); *Canner*, Sept. 30, p. 32 (1922).

389. Another case of ptomaine proves a myth. *Canner*, July 22, p. 33 (1922).

390. Canned foods poisoning cases fall flat. *Canner*, Aug. 5, p. 27 (1922).

391. Death of bi-chloride victim charged to canned foods. *Canner*, Nov. 25, p. 44 (1922).

LAWS, REGULATIONS AND STANDARDS

(*See also numbers 100, 138, 139, 152, 157, 239, 249, 250, and 252.*

392. Cut-out weights of canned foods. U. S. Bureau of Chemistry. *The Trade Almanac*, pp. 13-25(1922).—Instructions for draining are given; also the cut-out weights required by the Bureau of Chemistry for peas, unpitted cherries, pitted cherries, wax and refugee beans, peaches, lima beans, pears, spinach, swiss chard, beet tops, kraut, minced clams, and Maryland style corn. C. O. BALL

393. Weight or measure branding laws. *The Trade Almanac*, pp. 25-9 (1922).—The federal law, and the laws of the principal canning states, are abstracted. C. O. BALL

394. Important decision regarding labeling. NATIONAL CANNERS ASSOCIATION. *Trade*, May 27, pp. 22-6(1922).—A letter from J. Harry Covington, counsel of the National Canners Association, expresses his opinion regarding the application to the labeling of canned foods of a recent U. S. Supreme Court decision on the labeling of manufactured products. C. O. BALL

395. Intelligent labeling of canned foods. G. J. LANGE. *Trade*, Dec. 11, pp. 24-6(1922).

396. Declaration of net weight on canned clams and canned oysters. U. S. Dept. Agr., Bureau Chem., *Service and Regulatory Announcements*, Chem. 28, item 379.—Because the liquid packing medium in canned clams and canned oysters has a certain food value and is ordinarily utilized as food, no objection will be made to marking the net weight of these products in terms of total weight, liquid included. When such markings are made declarations of drained or cut-out weight will not be required, but in all cases these weights should equal or exceed those specified in opinions 2 and 3, pages 1 and 2, Service and Regulatory Announcements, Chemistry 1. Opinion 88, page 688, Service and Regulatory Announcements, Chemistry 9, is modified accordingly.

397. "Petit pois" peas. *U. S. Dept. Agr., Bureau Chem., Service and Regulatory Announcements*, Chem. 28, item 388.—Inquiries have been made concerning the propriety of labeling domestic canned peas as "petit pois" peas. It is the bureau's opinion that the term "petit pois" has lost such geographic significance as it may have had. Peas canned in the United States may therefore be labeled with this term, provided they are of the size of the peas that have been imported from France under this labeling—that is, the No. 1 sieve size.

398. Standardization, inspection, and labeling regulations under the Wisconsin marketing law. ALVIN REIS. *Trade*, May 1, p. 19(1922).—An address delivered at the convention of the Western Canners Association April 14, 1922. C. O. BALL

399. Need of uniformity in definitions of standards. H. M. LOOMIS. *Trade*, May 22, p. 24(1922).

400. Formulating official food standards. W. W. SKINNER. *Am. Food J.*, July, p. 9(1922).—A history of the work of the Joint Committee on Food Definitions and Standards, showing the personnel of the Committee, the principles upon which standards are based, the standards already adopted and the plans for future work.

401. Specialty manufacturers adopt code of ethics. *Am. Food J.*, Dec. 1, p. 9(1922).—At the Atlantic City Convention of the Am. Specialty Mfgrs. Assoc. a code of ethics was adopted that was approved not only by this Assoc., but as well by Nat. Whole. Grocers Assoc.; Am. Whole. Grocers Assoc., and the Nat. Assoc. of Retail Grocers.

GENERAL

402. **Home canning of fruits and vegetables.** *U. S. Dept. Agr. Farmers' Bull.* 1211 (Rev. August, 1922).

403. **Inspection of fruit and vegetable canneries.** F. B. LINTON, compiler. *U. S. Dept. Agr. Bull.* 1084.—The primary functions of food inspectors are to observe and report on the operation of food factories, among which fruit and vegetable canneries occupy an important place. What conditions or methods of handling foods the inspector should look for, and the standards with which these conditions or methods should be compared are discussed. The point of view from which the material is treated is confined to the making of thorough cannery inspections for the purpose of preparing a report that will serve as a basis for administrative action in the enforcement of a food-control law. P. L. GOWEN

404. **Report of the committee on problems of canning.** W. D. BIGELOW, ALBERT C. HUNTER, GEORGE A. MENGE, H. W. REDFIELD, A. G. WOODMAN. *Am. J. Pub. Health* 12, 591-3(1922).—A resumé of progress made in recent years in the technology of canning. C. O. BALL

405. **Report of the committee on preparation, packing, and transportation of foods.** W. H. LIPMAN, F. C. BLANCK, ANNA A. CHAPIN, ALFRED W. LOMBARD, T. D. BURDETTE. *Am. J. Pub. Health* 12, 108-12(1922).

406. **Report of committee on tin plate.** *Trade*, Feb. 6, pp. 86-7(1922).—This is the report rendered at the 1922 convention of the National Canners Association. C. O. BALL

407. **Department of Science and Industrial Research Food Investigating Board. The preservation of food by freezing with special reference to fish and meat.** *Analyst* 47, 392(1922).—The report contains thorough discussion of freezing, storage in frozen condition, and thawing or defrosting of meat products, with reference to the influence of low temperatures on enzymes, vitamins, colloidal systems, and living cells and tissues. Both air freezing and salt brine mixture methods were used. F. J. DASHNER

408. **Report of committee on conservation of food products.** *Trade*, Feb. 6, pp. 87-8(1922).—This is the report rendered at the 1922 convention of the National Canners Association. C. O. BALL

409. **Poisonous metals on sprayed fruits and vegetables.** W. D. LYNCH C. C. MCDONNELL, J. K. HAYWOOD, A. L. QUAINTANCE AND M. B. WHITE. *U. S. Dept. Agr., Bull.* 1027, 1-66(1922), through *C. A.* 16, 2006.—Numerous analytical results are given which show the amounts of arsenic, lead and copper remaining on mature fruits and vegetables which have been sprayed according to various schedules. In some cases comparatively large quantities of spray residues were found due to overspraying or late spraying, but when the spraying is done in accordance with the schedules recommended by the Bureau of Entomology and the Bureau of Plant Industry but little of the material used remains on the fruit or vegetables at harvest time. W. H. ROSS

410. **Fourteenth census of United States; manufactures, 1919; canning and preserving.** (1922). *Dept. of Com., Bur. of the Census.*

411. **Interesting substitutes for food products.** A. VIEHOEVER. *Am. Food J.*, Jan., p. 21(1922).—Certain new food products are discussed, suggesting

the possibility of their substitution for certain well-known foods, e. g., tepary beans for navy beans, *Solanum macro-carpum* for tomatoes, and African sorrel for spinach.

412. **Food flavors, their source, composition and adulteration.** J. W. SALE AND W. W. SKINNER. *Am. Food J.*, May, p. 13; June p. 31; July p. 27; Sept. p. 27; Nov., p. 29; Dec., p. 29 (1922).—A discussion of the source, composition and characteristics of various products used for flavoring foods.

413. **The influence of air, light, and metals on the development of rancidity.** J. A. EMERY AND R. R. HENLEY. *J. Ind. Eng. Chem.* 14, 937-40 (1922).—Fats, even when kept in contact with metals, exposed to light and at summer temperatures, did not become rancid provided that air was excluded. However, the development of rancidity was not prevented when fats, alone and in contact with metals, were kept in a Novy jar through which carbon dioxide, presumably oxygen free, was passed continuously. Fats stored, with and without contact with metals, in an atmosphere of oxygen developed rancidity at an earlier date, and the development of rancidity progressed more rapidly, than when the same fats were held in an atmosphere of air all other conditions being the same. The development of rancidity was hastened when the fats or oils were in contact with metals provided there was free access of air or oxygen. Some metals, however, acted more energetically than others. The action of the metal was independent of the corrosive action of the fat upon the metal. In other words, metals hastened the production of rancidity in fats even when the metals themselves were not attacked. Light was necessary for the development of rancidity in fats exposed to air and not in contact with metals, but fats stored in contact with metals developed rancidity even when protected from light. In other words, light in the absence of metals appeared to exert the same effect as was exerted by metals in the absence of light. In one test it was indicated that the direct part taken by moisture in the development of rancidity, at least in comparison with the other factors discussed, is negligible. P. J. DONK

414. **A contribution to our knowledge of processing.** W. D. BIGELOW. *Trade*, Feb. 20, pp. 8-9 (1922); *Canner*, Feb. 18, p. 33 (1922).—A review of *U. S. Department of Agriculture Bulletin* 1022, "Relation of initial temperature to pressure, vacuum, and temperature changes in the container during canning operations," by Magoon and Culpepper. C. O. BALL

415. **Directions for the handling of frozen canned foods.** *The Trade Almanac*, p. 93 (1922).

416. **Quality of tin-plate and its influence on the quality of tinned foods, etc.** H. SERGER. *Z. Offentl. Chem.* 27, 133-9 (1921), through *C. A.* 16, 2942.—During the last few years the quality of the tin-plate used for making containers for preserved foods, etc., has deteriorated considerably; the coating of tin on the plate is often less then 0.1 g. per square centimeter and "pinholes" are numerous. Where the latter exist there is more or less rapid attack of the iron plate and the contents of the tin are spoiled. It is suggested that each side of tin-plate should have a coating of not less than 0.2 g. of tin per square centimeter. J. C. S. I.

417. **U. S. foodstuffs division to assist in trade promotion programs.** E. G. MONTGOMERY. *Am. Food J.*, Jan., p. 35 (1922).—The purpose of the Division is to co-operate closely with Trade Associations in the stimulation of foreign commerce and the preparation of standard information on all commodities. Foodstuffs will be handled in fourteen major divisions, viz., breadstuffs, meats

and meat products, fats and oils, dairy products, canned foods, fresh fruits, dried fruits, sugar, confectionery, beverages, chocolate and cocoa, nuts, coffee, tea and spices, and groceries. In its early work the Division will limit its work largely to programs developed by conferences with organized trade groups. In the canned foods section four national and fifty regional organizations will cooperate. As the Division is further organized standard information available on each product will be supplied. Other kinds of information that will be supplied include foreign tariffs, copyright and trademark regulations, customs duties, a world trade directory, shipping routes, rates, packing and other transportation problems, handling of delinquent foreign accounts, etc. When the trade desires to have investigations made or reports from foreign countries, the Division will be glad to assist in preparing the inquiry, collecting the information, and distributing it through the proper channels. J. P. STREET

418. **A study of the factors affecting temperature changes in the container during the canning of fruit and vegetables.** C. A. MAGOON AND C. W. CULPEPPER. *U. S. Dept. Agr. Bull.* 956, 55 pp. (1921).—A report is given of an extensive investigation of the factors influencing temperature changes in the containers (both tin and glass of various sizes) during the single period and intermittent processing of vegetables and also during the subsequent cooling. The products investigated were string beans, peas, lima beans, soy beans, asparagus, sweet corn, pumpkins, sweet potatoes, tomatoes and cabbage. P. L. GOWEN

419. **Relation of initial temperature to pressure, vacuum and temperature changes in the container during canning operations.** C. A. MAGOON AND C. W. CULPEPPER. *U. S. Dept. Agr. Bull.* 1022, 52 pp., figs. 37 (1922).—Pressure, vacuum and heat penetration studies on string beans, peas, tomatoes, corn, sweet potatoes and spinach are reported and discussed. P. L. GOWEN

420. **Canned food weights.** *Trade Almanac*, pp. 45-7 (1922).—This is a list of suggested arbitrary weights approved by the Conference Committee of the National Wholesale Grocers' Association and the National Canners' Association. C. O. BALL

421. **Season when various products are packed in the different states.** *The Trade Almanac*, pp. 94-7 (1922).

422. **Ammonia as a refrigerant. I.** W. H. MOTZ. *Can. Chem. Met.* Dec., pp. 260-4 (1922).—A study of fundamental data relative to all factors in the operation of compression refrigerating systems. H. H. HOWRY

423. **More economic and scientific methods of food distribution needed.** *Am. Food J.*, Aug., p. 9 (1922).—A study of the distribution of the consumer's dollar in such products as macaroni, canned milk, peanut butter, corn flakes, wheat cereal, rolled oats, salt and bread. While the processes of manufacture have become economical and efficient, distribution has become expensive and inefficient.

424. **Food Products Institute of New Jersey is organized.** *Am. Food J.* Apr., p. 19 (1922).—Food manufacturers of New Jersey have organized an Institute: 1, to better conditions and promote the welfare of the food producing industries of the state; 2, to make possible a practical and scientific study of food values; 3, to limit membership to such firms as can qualify by meeting the standards set by the society; 4, to promote research in the food industry by providing a laboratory for that purpose; 5, to promote the consumption of Jersey-made products within the state. J. P. STREET

425. **Putting branded foods on the menu.** C. A. PATTERSON. *Am. Restaurant*, Mar., p. 40 (1922).—Five thousand letters were sent out in a nationwide questionnaire among restaurants as to the desirability of this practice. Replies were received from over 3000. 23% were opposed; 48% favored the plan but had not tried it; 27% were doing it; 2% had tried and abandoned it.

426. **Canned foods cleared in suit won by Alaska Packers Association.** *Canner*, Aug. 5, p. 27 (1922).

427. **Treatment, cooking and sterilization of food or other substances by heat in sealed containers.** N. H. FOOKS. E. P. 158,232 7.1.21 conv. 24.1.20; *J. Soc. Chem. Ind.* 41, 30A (1922).

428. **Official measurements of standard cans.** *Trade Almanac*, p. 87 (1922).

429. **Weights of filled cases.** *Trade Almanac*, p. 41 (1922).

430. **How to reduce all cans to No. 3's.** *Trade Almanac*, p. 114 (1922).

431. **Specifications for shipping cases.** A. W. BITTING. *Trade Almanac*, pp. 99-106 (1922).—The specifications are reprinted from bull. No. 40, National Canners Association.

432. **A new canning process is announced.** *Canning Age*, Jan., pp. 13-15 (1922).—A description of Rector-Tenney process for canning in an atmosphere of carbon-dioxide.

433. **Food institute makes announcement.** *Am. Food J.*, May, p. 23 (1922).—Announcement of the purposes and the aims of the Food Research Institute of Stanford University.

434. **New micro-photographs of the more common starches.** CRYSTAL B. FALL. *Chem. Age.* 31, 37-38 (1923).

435. **Some experiments with a boric-acid canning powder.** R. B. EDMONDSON, C. THOM AND L. T. GILTNER. *U. S. Dept. Agr. Circ.* 237.

436. **A sermonette for canners.** *Trade*, (1922).—No. 1, Have faith—and live! Feb. 20, p. 20; No. 2, The canned foods label. Feb. 27, p. 20; No. 3, Character in the canned foods label. Mar. 6, p. 28; No. 4, Character in the label itself. Mar. 13, p. 32; No. 5, The label, the window of the can, Mar. 27, p. 28; No. 6, As to canners whose labels compete rather than cooperate with one another, Apr. 3, p. 28; No. 7, In which the new regulations governing the marking of Wisconsin peas is discussed. Apr. 7, p. 32; No. 8, The advertising value of the canned foods label. Apr. 17, p. 32.

LIST OF PUBLICATIONS ABSTRACTED

There is given below a list of the journals from which articles are abstracted, together with the abbreviations which are used for the same. In addition to these journals, many miscellaneous publications are abstracted such as the publications of the various Departments of the Federal Government and of the several states as well as university publications.

Abstracts of Bacteriology	Abstracts Bact.
Agricultural Index	Agr. Index
American Fruit Grower	Am. Fruit Grower
American Food Journal	Am. Food J.
American Grocer	Am. Grocer
American Journal of Hygiene, The	Am. J. Hyg.
American Restaurant	Am. Restaurant
American Vinegar Industry and Fruit Products Journal	Am. Vinegar Ind.
Analyst	
Annales des falsifications et des fraudes, Les	Ann. fals.
Annales de l'institut Pasteur	Ann. inst. Pasteur
Arbeiten aus dem Reichsgesundheitsamte	Arb. Reichsgesundh.
Associated Grower	
Better Cooking	
Better Fruits	
Beverage Journal, The	Beverage J.
Biochemical Journal, The	Biochem. J.
Botanical Abstracts	Botan. Abstracts
British Food Journal and Hygienic Review, The	Brit. Food J.
Bulletin de l'institut Pasteur	Bull. inst. Pasteur
California Citrogrape	Cal. Citrogrape
California Fish and Game	Cal. Fish Game
California Fruit News	Cal. Fruit News
Canadian Chemistry and Metallurgy	Can. Chem. Met.
Canadian Fisherman	Can. Fisherman
Canner, The	Canner
Canning Age, The	Canning Age
Chemical Age (New York)	Chem. Age
Chemical Abstracts	C. A.
Chemical and Metallurgical Engineering	Chem. Met. Eng.
Chemical News	Chem. News
Chemiker Zeitung	Chem. Ztg.
Chimie & industrie	
Centralblatt fur Bakteriologie	Centr. Bakt.
Citrus Industry	Citrus Ind.
Creamery & Milk Plant Monthly	
Cotton Oil Press	
Comptes rendus hebdomadaires des seances de l'cademie des sciences	Compt. rend.
Evaporator	
Experiment Station Record	Expt. Sta. Record
Fibre Containers	
Fish Trades Gazette	
Fish and Oyster Reporter	
Fishing Gazette	
Forecast	

Fruitman	
Hygienische Rundschau	Hyg. Rundschau
Hoard's Dairy	
Iron Age	
Journal of the American Chemical Society	J. Am. Chem. Soc.
“ “ “ American Medical Association	J. Am. Med. Assoc.
“ “ “ Association of Official Agricultural Chemists	J. Assoc. Official Agr. Chem.
Journal of the Agricultural Research	J. Agr. Research
“ “ Bacteriology	J. Bact.
“ “ Biological Chemistry	J. Biol. Chem.
“ “ Dairy Science	J. Dairy Sci.
“ “ Economic Entomology	J. Econ. Entomol.
“ “ Home Economics	J. Home Econ.
“ “ Hygiene	J. Hyg.
“ “ Industrial and Engineering Chemistry	J. Ind. Eng. Chem.
“ “ Infectious Diseases	J. Infectious Diseases
“ “ Medical Research	J. Med. Research
“ “ Metabolic Research	J. Metabolic Research
“ “ Pathology and Bacteriology	J. Path. Bact.
“ “ Public Health	
“ “ the Royal Sanitary Institute	J. Roy. Sanit. Inst.
“ “ the Society of Chemical Industry	J. Soc. Chem. Ind.
Medical Officer, The	Med. Officer
Milk Dealer, The	Milk Dealer
Mitteilungen aus dem Bebiete der Lebensmitteluntersuchung und Hygiene	Mitt. Lebensm. Hyg.
Monthly Catalogue of U. S. Public Documents	
Nation's Health	
New York Produce Review and American Creamery	N. Y. Produce Rev.
Oregon Grower	
Pacific Bottler	
Pacific Fisherman	
Phytopathology	
Proceedings of the Society for Experimental Biology and Medicine	Proc. Soc. Exp. Biol. Med.
Public Health Reports	
Revue d'hygiene	Rev. hyg.
Soil Science	
Sunsweet Standard	
The Canning Trade	Trade
The Trade Almanac	
Weekly Official Record of Department of Agriculture	
Western Canner and Packer	
Western Confectioner	
Zeitschrift für Untersuchung der Narhungs und Genussmittel sowie der Gebrauchsgegenstande	Z. Nahr. Genussm.
Zentralblatt fur gesamte Hygiene	Zentr. ges. Hyg.
Zeitschrift für physiologische Chemie	Z. physiol. Chem.
Zeitschrift für öffentliche Chemie	Z. öffentl. Chem.

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AB

ABSTRACTS OF CANNING TECHNOLOGY

UNIVERSITY OF ILLINOIS
LIBRARY-CHEMISTRY

Editor: W. D. BIGELOW, *Director of Research Laboratory.*
Associate Editor: A. E. STEVENSON

VOL. I. APRIL No. 2

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FACTORY CONSTRUCTION AND EQUIPMENT

437. **Standard thickness of sheet metal.** *Iron Age* 111, 470 (1923).—Letter circular 24, one of the mimeographed circulars of the Bureau of Standards, Washington, gives standard thicknesses of sheet metals including steel plate in sheets, galvanized sheets, copper, brass, aluminum, tin and terne, zinc and monel metal. The various sheet metal and wire gages used in designating the thicknesses are also discussed. The circular is a collection into useful form of information that has heretofore been widely scattered and inaccessible. A limited number of copies of this circular may be obtained from the bureau. A. H. CARLE

438. **Increasing uses for tin plate.** *Iron Age* 111, 104 (1923).—It is estimated by leading factors in the tin plate producing and consuming trade that about 42,000,000 to 44,000,000 base boxes represents fairly accurately the annual capacity of American mills. The 1922 output of both tin and terne plates was probably about 33,000,000 base boxes. Of the tin plate 70% appears to have gone for food containers. There are increasing numbers of products besides food products being put up in tin containers, such for example as tobacco and confectionery. A. H. CARLE

439. **Simplifying metal containers.** *Iron Age* 111, 280 (1923).—A brief summary of the recommendations of the metal container committee is given.

440. **Status of the tin can in the food preserving industry.** H. A. BAKER. *Trade*, Mar. 19, pp. 14-18; Mar. 26, pp. 14-18 (1923); *American Grocer*, Feb. 21 (1923).—Answers are given to two questions; (1) could tin plate be made better under the present system of manufacture, and (2) could canners pre-

pare and can their food products so as to eliminate or to greatly reduce the attack of food substances on tin container? The former—in the light of present knowledge, based upon the results of extensive experiments—must be answered in the negative until such time as new discoveries may make possible the production of an improved base or of a better tin or enamel coating. A steel alloy may bring about the improvement desired in the base. Increasing the weight of tin coating has apparently no effect upon the discoloration of foods, but has a very beneficial effect in reducing the tendency to perforate. A summary of the results which should or should not be expected is given for the following substances; peas, tomatoes, tomato pulp and tomato paste, corn, baked beans and red beans, salmon, pears, peaches, apricots, pineapple, string beans, asparagus, hominy, sauerkraut, soups, sweet potatoes, spinach, lima beans, succotash, canned syrup, oysters, clams, sardines, tuna fish, lobster, shrimp, okra, canned meats, prunes, grapes, raisins, figs, spaghetti, milk, pumpkin, beets, rhubarb, grapefruit, apples, cherries, cider, apple butter, jams and preserves, plums, and berries. C. O. Ball

441. **Stainless and rustless steel.** *Cotton Oil Press* 6, No. 12 (1923).—Reports the discovery by F. C. Buchanan of El Paso, Texas, of a new process for the manufacture of the above. The product is said to have been successfully used for containing fruit juices (orange, lemon and grape) and several corrosive chemical reagents.

SANITATION, WASTE DISPOSAL AND WATER SUPPLY

(*See also number 470*)

442. **Ozone and ozonizers.** F. E. Hartman, Chief Chemist, U. S. Ozone Co. *Chem. Age.* 31, 125-129(1923).—Ozone and its various uses are described. A very full description is given of the disinfection of water, also the apparatus with numerous illustrations. W. W. Murray

443. **Furfural for the production of synthetic resins.** *Chem. Age.* 31, 62(1923).—Furfural is the product of the adhesive which is obtained by heating corn cobs with water under pressure and concentrating the resulting extract. This extract on treatment with dilute mineral acid yields furfural to the extent of 25% of the total solids present. Max Phillips and Gerald H. Mains, Chemists of the U. S. Dept. of Agr. have been granted U. S. Pat. 1,441,598 issued Jan. 8, 1923, on new products made from furfural and dedicated the same to the free use of the Government and the people of the United States. Their products comprise nine resins formed by the interaction of furfural and the following compounds, viz: meta-nitroaniline, alpha-napthylamine, para-toluidine, beta-napthylamine, meta-toluylenediamine, methyl ethylketone, ortho-toluidine, cymidine and zylidine. Brief descriptions of the procedures and the products follow, also a statement of their general characteristics. W. W. Murray

444. **Studies made in agricultural chemistry by the department of Agriculture during 1922.** *Am. Vinegar Ind.* Jan., pp. 3-4(1923).—Brief review of the results of investigation on utilization of cull fruits and vegetables, which have previously been reported. E. H. Weigand

FRUITS AND FRUIT PRODUCTS

(See also numbers 494, 495 and 496)

445. Experiments in apple packing. B. S. CLARK. *Canning Age*, Feb., p. 17(1923); *The Canner* (Convention number) Mar. 3, p. 149(1923); *The Trade*, Feb. 26, pp. 14-18(1923).—An investigation was made of the amounts and composition of gases in apples and changes in composition during soaking in warm brine solution, and a description is given of experiments with "solid pack" Michigan apples. Total gas was determined in samples of eleven varieties of Michigan apples. Gas in one pound samples varied from 7.4 cu. in. to 9.8 cu. in.; carbon dioxide from 5.3% to 16.7%; oxygen from 8.5% to 17.7%; nitrogen from 70.4% to 79.6%. By soaking in a 3% brine at 130° F. for periods of 20, 40, and 60 minutes it was found that the evolution of gas was most rapid during the first 20 minutes. The maximum amount liberated during a 60 minute soaking period was 37.8%. The minimum amount liberated during the same period was 20.8%. Analyses of the gases brought out the striking fact that carbon dioxide and nitrogen were liberated throughout the entire 60 minute period but the liberation of oxygen practically ceased at the end of 20 minutes. It was also noted that with one exception the percentage of carbon dioxide in the gas liberated during the soaking was higher than the percentage of carbon dioxide initially present. It appears that at the elevated temperature of the soaking bath a considerable portion of the free oxygen initially present was converted to carbon dioxide before it could be liberated from the apples. An important factor in perforations was found to be the salt content, and this factor should be considered in determining the most satisfactory soaking time. Experiments showed that with longer soaking perods more salt was taken up and the number of perforations proportionately increased. A satisfactory "solid pack" was made with Michigan apples by soaking the quarters 40 minutes in a 3% brine at 130° F., steaming for three minutes, spraying with cold water for one-half minute, draining and filling. When the steaming chamber was held at 180° F., 5 lbs. 5 oz. could easily be weighed into a No. 10 can, and greater amounts when higher steaming temperatures were employed.

H. L. HUENINK

446. Raisin by-products now seriously considered. *Am. Vinegar Ind.*, Apr. 2, pp. 14-15-21(1923).—Of possible products in which raisins may be used, ice cream, candy, syrups and carbonated beverages are emphasized. Of the possible outlets for fresh grapes, their use in table syrups, bottling and fountain syrups and in juice seem most promising. ERNEST H. WEIGAND

447. Fruit jellies. I. Role of acids. L. W. TARR. *Del. Sta. Bul. 134*, pp. 38.—The firt of a series of bulletins on the physical chemistry of jelly formation. With the pectin, sugar and water factors constant, the acidity factor was studied with the following conclusions: (1) The formation of fruit jellies cannot be correlated with total acidity; (2) there is a direct relation between jelly formation and hydrogen ion concentration; (3) the minimum hydrogen ion concentration at which jelly formation occurs is pH 3.46 for the purest pectin used; (4) the character of the jelly is determined by the hydrogen ion concentration; (5) tartaric acid is the most efficient of fruit acids for jelly making purposes, citric acid the least efficient, and malic probably between the two. P. L. GOWEN

448. By-products from citric fruits. E. M. CHACE. *U. S. Dept. Agr. Cir. 232*, p. 13 (1922).—Directions are given for the manufacture of bottled grapefruit juice, orange vinegar, citric acid from lemon and lime juice, and recipes for small or large scale production of candied orange and grapefruit peel, citrus fruit marmalades and jellies and fruit butters. P. L. GOWEN

450. The relation of oxygen to perforations. E. F. KOHMAN. *Trade*, Feb. 19, pp. 20-24 (1923).—Oxygen is the active substance which causes corrosion of tin plate. It is therefore important to exclude it from the sealed can of food to as great an extent as possible. When a can is filled, oxygen is contained within the contents in three different ways: in the food product itself, in solution in the water, and in air spaces between solid portions of the food. The oxygen content of gases present within fruits and vegetables may vary from zero per cent to 20%. Determinations made on York Imperial apples showed 18% just after being taken from cold storage, 14% after storage at 70° for 28 hours, and 12% after storage at 100° for 28 hours. A variety of reasons combine to make impracticable the reduction of oxygen content by storage at relatively high temperature. In order to completely expel dissolved oxygen from water which is to be used in canning, vigorous boiling for a few minutes is necessary. An efficient exhaust serves to drive the oxygen from the airspaces and to cause the rise of water vapor from the surface of the contents which to a large extent replaces the air in the space between cover and contents at the time of closure. Oxygen may be removed from the solid portions of a fruit by evacuating—then allowing the avacuated spaces to fill with water, syrup, or nitrogen. The same object may be accomplished by covering the fruit with a brine and allowing to stand for some time at room temperature or a slightly higher temperature. The oxygen will be removed by the process of respiration. Experimental results are given showing the reduction of oxygen content of cans of fruit produced by boiling the water previously to filling, also the reduction of oxygen content of apples by soaking in 3% brine at different temperatures. C. O. BALL

451. Precooling of summer fruits. J. R. MAGNESS. *Am. Fruit Grower*, Apr., pp. 5-15 (1923).—The term "precooling" is applied to an initial rapid lowering of the temperature of a product before transporting it to market. Two methods used are car precooling and warehouse precooling, the latter being more successful. Salient requirements for successful precooling are: (1) picking when fruit is in right condition of maturity; (2) prompt removal to cold storage; and (3) rapid cooling. Important considerations in constructing plant are: (1) air movement in rooms; (2) rooms not too large; (3) ample space so that fruit is not stacked closely. For most products, temperatures of 35° to 45° F. in the center of the pack will be satisfactory.

ERNEST H. WIEGAND

452. Sun drying peaches. ARTHUR W. CHRISTIE. *Associated Grower*, 5, No. 3, 7, 24-6 (1923).—A summary of what may be termed standard methods of peach drying. C. A. MAGOON

453. Uber Traubenholunder-Marmelade. (Elderberry marmalade). JUSTIN GREGER. *Z. Nahr. Genussm.* 42, 383-4 (1921); *Botan. Abstracts* 12, No. 1, 77 (1923).

452. The acids of the apple. FRANZEN and HELWERT. *Z. physiol. Chemie,* 127, 14(1923).—The acids of the apple consist largely of malic acid and an appreciable amount of citric acid, small amount of succinic and lactic acids, very small amount of oxalic and traces of unsaturated acids. F. C. BLANCK

455. Raisin by-products not seriously considered. W. V. CRUESS. *Am. Vinegar Ind.* Mar., pp. 14-16(1923).—It is estimated that if 10% of all bakers' bread were raisin bread, 100,000 tons of raisins would be used. Sugar is made from waste material from seeded raisins. This material contains an average of 20% sugar. There is now 10% loss through waste. The waste from 45,000 tons of seeded raisins will make 225,000 gallons of syrup. The sugar in the raisin seed waste can be converted into alcohol. This waste is also utilized for vinegar. Continued. E. H. WIEGAND

457. True fruit flavors not true. C. H. MCCHARLES. *Pacific Bottler,* Jan., pp. 18-19-42-43(1923).—A true fruit-flavored, carbonated beverage ordinarily consists of water, sugar, acid, gas, color, and a flavoring substance. True fruit flavors are expensive. If a true fruit-flavored strawberry drink contains as much flavor as strawberry juice, then it must require the working up of an equal volume of strawberries to produce that much flavor. That amount of flavor in an eight ounce drink will cost the extract manufacturer nearly as much for raw material as a half pound of strawberries is worth. This cost can be cut by using up pulp as filler in other food products, but having lost its flavor it can not be used as strawberries. This cost can be cut further by using some juice for other purposes. Arguments to the contrary are based on using considerably less flavor in the beverage. The substances which give the common fruits these characteristic flavors are very powerful, present in amounts probably less than a tenth of 1%. Extracted with dilute alcohol-extract shaken with petroleum ether and the latter evaporated off, leaving a crude mass containing almost the entire flavoring matter of the berries, a ton of berries yields less than one pound. This extract may be dissolved in alcohol and diluted up to any strength to be sold to the trade. Another method is to soak juice or fruit in alcohol and distill under vacuum. Most of the flavor comes off and is condensed with the alcohol. Wild berry flavors are very sensitive to distillation and more safely handled by the extraction method—strawberries being the most easily injured. In pitted fruits the pits are removed because they contain so much benzaldehyde or oil of bitter almonds that fruit flavor will be masked. Distilled essences are nearly colorless and true fruit colors come from percolating over fresh fruit. Essences can be made by percolating dried fruits with alcohol of suitable strength. Imitation flavors are mixtures of various chemical ethers which have powerful odors and some resemble fruit odors. The mixed ethers constitute the so-called oils used by candy makers. The citrus oils are not fruit juice flavors, they are peel flavors. Any of these oils dissolved in 85% alcohol to the extent of 5% or more pass for extracts. Such extracts make cloudy products when bottled and for this reason the bottlers are supplied with a so-called terpeneless extract, which is soluble. E. H. WIEGAND

458. Ten cent seller possible, says John Buxman. NAOMI SWEET. *Pacific Bottler,* Jan., p. 20(1923).—When properly handled, bottled true fruit extracts will produce a beverage that with little difficulty will sell for ten cents. But people must be convinced that an article is better in every way. In producing one gallon of our own fruit concentrate we use 60 pounds of fresh fruit. True fruit drinks must be pasteurized to produce the highest class of drink. The requirements in equipment for pasteurization are a small steam boiler of about 5 H. P., a wooden tank equipped with coils, perforated galvanized metal trays, and a block and tackle. The filled and capped bottles are placed upon the trays, lowered into a vat of cold water, the temperature raised to 150° F. and the steam regulated to hold water at that temperature from 15 to 30 minutes. The steam is then shut off and the bottles taken out of the water when it has lowered to 120° F. Fruit beverages pasteurized in this method will keep indefinitely, and no spoilage will occur. E. H. WIEGAND

459. Pure fruit syrups can be kept 'till used. *Pacific Bottler*, Feb., p. 44 (1923).—Pure fruit juices can be kept in sealed containers at room temperature for indefinite periods, by pasteurizing the juices in lacquered cans or glass. Syrups so kept will deteriorate slightly in color and flavor, but still produce very pleasing beverages when diluted with carbonated water. It is possible for the bottler to make up a great quantity of juices during the fruit season and use them whenever needed. E. H. WIEGAND

460. Acids present in fruit juices and jellies. C. F. MUTTELET. *Ann. fals.* 15, 453-455 (1922); through *J. Soc. Chem. Ind.* 42, 197A (1923).—Cherry, apple, pear, quince and greengage juices contain malic acid but no citric acid; currant, raspberry and strawberry juices contain citric acid but no malic acid; while apricot and peach juices contain both these acids. The presence of malic acid in raspberry and currant juice, therefore, indicates the presence of another fruit (probably apple) juice. The two acids mentioned may be separated together as their barium salts and isolated from each other by fractional precipitation from dilute alcohol solution.

461. The keeping quality of pomace—its sale based on pectin present. JULIAN S. COHEN. *Am. Vinegar Ind.* Jan., pp. 11-20 (1923).—In the better grades of pomace, which has been dried properly, the moisture content is below 10%, usually about 8%. There is some loss of pectin content of pomace which has stood for a considerable period. The moisture present, though small, is sufficient to assist the carrying out of a chemical reaction whereby a conversion of pectose and pectin takes place with the elimination of methanol and formation of pectic acid which is of no value for jelly purposes. A careful examination reveals the fact that pectin in old pomace (open to the air) is considerably reduced and of little or no value commercially. It is suggested that in future dried apple pomace be sold on the basis of pectin present in a good representative sample of the pomace. By this means a better value of apple pomace can be obtained. The following test is offered—a sample obtained from various parts of a shipment would be quartered until a pound of material is left. Place this in three liter flask under a reflex condenser with ten pints of water and gently boil for ninety minutes. Resultant mass passed through fine mesh heavy muslin cloth in a fruit press. This will give about 75% of the volume of the added water. From the resultant solution pipette off 10 c. c. of the liquor and add 10 c. c. of cold water. Precipitate the pectin by adding 40 c. c. of alcohol. Roll the resultant pectin precipitate into one mass and squeeze out the alcohol as much as possible and transfer to 20 c. c. of hot water, in which it will dissolve. Precipitate again with 30 c. c. of alcohol. Squeeze out the liquor and transfer to a watch glass and dry. The per cent pectin is then obtained by the following formula: weight of dry pectin x volume of pectin solution in c. c. x 100. Weight of pomace=per cent to be obtained from pomace. This result can be checked to within a few hundredths of 1% although, due to heating variations, the difference may amount to .2%. Figures should be given in tenths of a per cent. E. H. WIEGAND

462. Improved Oregon tunnel drier. E. H. WIEGAND. *Better Fruit*, Jan., pp. 7-8(1923).—The cost of converting an old dried into a recirculated air tunnel, including a fan, should not exceed $700, less the power unit for a four tunnel drier. An opening two feet wide is cut through the floor in the fresh fruit end of the tunnel. A duct is then built to lead the air through this opening to a fan situated in front of the furnace pit, thus returning the air still hot to be recirculated and reheated over the fruit. All fresh air intakes at the base of the pits are closed, all leaks securely sealed up to prevent escape of heated air, which is under pressure. The stove and piping are made leak proof by cementing joints and cracks. As the air is circulated the humidity is gradually built up until it reaches a point where it is most effective, 20 to 25%. When this point is reached some fresh air should be taken in at the fan and stale air allowed to pass out through a small opening in the stack. When regulation has once been established, further adjustment is seldom necessary, as the humidity will remain almost constant if the temperature is kept at a certain point. In this system the temperature should not exceed 160° F. This prevents scorching. The circulation should be from 700 to 750 L. F. M.; it has a cooling effect and assists in rapid elimination of the moisture of the fruit. There is one feature we must not overlook when installing mechanical circulation. The short tunnels do not lend easily to this method of drying although a good product can be obtained. Drip is excessive, due to the fact that fresh fruit comes in contact with the hot air much too soon, causing rapid expansion of the moisture in the fruit. This can be overcome by building on to the tunnels or by carrying a lower temperature (of 150° F.) at the throat. E. H. WIEGAND

VEGETABLES

(*See also numbers 507 and 518*)

463. Cost finding by sizes of string beans. E. J. COLEMAN. *Canning Age*, Feb., p. 27(1923); *The Canner* (Convention number) Mar. 3, p. 131(1923).—Average yield for New York is about 42%, Nos. 1, 2 and 3. Some packers otbain over 50% of these sizes. A system of cost calculation based on the selling price, fixed material cost and variable material cost shows that it is far more profitable to pack the smaller sizes than the larger sizes. In the hypothetical calculations a packer with the average yield of 42.41%, Nos. 1, 2 and 3 show a profit of 34½c per case; a packer with a yield of 20% better than the average, 52c per case; and a packer with 20% less than the average, 16.8c per case. Some of the larger sizes, especially the standard grades, show losses even to the extent that it is more profitable to throw them away than to can them. H. L. HUENINK

464. Processing of string beans. W. D. BIGELOW. *Canner*, Mar. 3, p. 124(1923), (Convention Number); *Trade*, Feb. 12, pp. 42-44(1923), (Convention Number).—The minimum process for safety with respect to B. botulinus is as follows: No. 2 cans, 19 minutes at 236° F. or 13 minutes at 240° F.; No. 10 cans, 25 minutes at 236° F. or 18 minutes at 240° F. A slightly longer time may be necessary to destroy other bacteria under some circumstances. Five and one-half hours at 212° F. is required for equivalent sterilizing value. The open or boiling process should never be used for string beans. It is claimed by some that the use of soft water makes possible a shorter process with baked beans as the process is ordinarily carried further than necessary to sterilize in order to soften the beans. Hard water apparently has no effect on string beans. Only two out of eight or ten experimental packs of baked beans showed any difference in beans due to use of hard or soft water. String bean process given above is probably insufficient to properly soften the beans. The effect of altitude on the boiling water process is remarkable. At sea level, 5½ hours, at 2,000 ft. elevation, 8 or 9 hours, at 10,000 ft. elevation, about 30 hours at boiling temperature may be necessary to kill B. botulinus. B. S. CLARK

465. **Wisconsin beet grading.** GEO. F. GREB. *Canner,* Mar. 3, p. 135(1923), (Convention Number); *Trade,* Feb. 12, pp. 44-45(1923), (Convention Number).—Beets are graded for size by means of home made screens. Two inch mesh grades 10 or more; 1 13/16 inch, 15 or more; 1⅝ inch, 20 or more; 1 7/16 inch, 30 or more; 1¼ inch, 40 or more; 1⅛ inch, 60 or more; and 1 inch, 80 or more beets per No. 3 can. For No. 2 can, 1 13/16 inch mesh grades 7 or more; 1⅝ inch, 10 or more; 1 7/16 inch, 15 or more; 1¼ inch, 25 or more; and 1⅛ inch, 35 or more beets per can. For No. 10 cans, 2 inch mesh grades 30 or more; 1 13/16 inch, 50 or more; 1⅝ inch, 70 or more; 1 7/16 inch, 100 or more; 1¼ inch, 130 or more; 1⅛ inch, 200 or more; and 1 inch, 250 or more beets per can. Beets over 2¾ inches in diameter are packed as cut beets either in quarters or eigths, depending on the size. Sizes between 2 and 2¾ inches diameter are used for sliced beets, slices being ¼ to 5/16 inch thick. The above sizes refer to beets after peeling.

B. S. CLARK

466. **Some canning tests on winter broccoli.** E. H. WIEGAND. *The Oregon Grower* 4, No. 7, p. 28(1923).—Experiments on the canning of broccoli at the Oregon Agriculture College resulted in the following recommendations: (1) remove leaves and cut curds apart; (2) soak 12 to 24 hours in cold 3° Salometer brine; (3) blanch in boiling 2½° Salometer brine, chill in cold water; (4) fill 17½ ounces per No. 2½ can; (5) add boiling brine 1½° Salometer; (6) exhaust 5 minutes at 185°; and (7) process 12 minutes at 240°, cool. A. W. CHRISTIE

467. **Effect of cooking on the vitamin content of cabbage.** WALTER H. EDDY, ELIZABETH SHELOW, RAMONA PEASE, MIRIAM RICHER, and LILLIAN WATKINS. *J. Home Econ.* 15, No. 1, 15-23(1923).—Results indicate that cooking cabbage or swedes until ready for the table destroys 90 to 95% of vitamin C. Pressure cooking is no worse than ordinary cooking at 212° because of shorter time necessary. Acidification of cabbage with vinegar before cooking (juice pH 4.9 at end of cook) failed to reduce the destructive action. Experiments show cooking process has little effect upon vitamins A and B. (See also No. 122). H. H. HOWRY

468. Preserved peas. *Brit. Food J.* 25, 7-9-19-38-40(1923).—London dealers were prosecuted for selling tinned peas which contained copper sulfate.
EDWIN LEFEVRE

469. Effect of hard water on peas. A. E. STEVENSON. *Canning Age*, Feb., p. 21(1923); *The Canner* (Convention number) Mar. 3, p. 137(1923); *The Trade*, Feb. 12, p. 46(1923); *American Grocer*, Apr. 14, p. 10(1923).—The use of hard water in blanching and brining has a toughening effect on the peas. In blanching, as generally carried out, the effect is not marked and varies because of differing conditions. The use of hard water in blanching tends to produce a nonuniform product. The effect in general depends on the hardness of the water, its rate of flow into the blancher, the time of blanch, and the relative amount of peas and water passing through the blancher. In brining, the toughening effect on the peas is roughly proportional to the hardness of the water and a hardness of 150 parts per million as calcium carbonate was found to produce a distinctly perceptible hardness in No. 3 Alaska peas. The effect on the more mature peas was more marked than on the younger peas. The use of softened water in blanching and brining will improve the quality of canned peas. Many grades of salt contain sufficient calcium and magnesium compounds to have a distinctly hardening effect on peas, and care in the purchasing of salt to be used as brine for peas is advisable. The use of salt containing calcium and magnesium compounds calculated as calcium carbonate of not more than 0.25% would be advantageous. The use of soft water and of salt low in calcium and magnesium are not substitutes for other factors necessary in securing good quality, but are merely additional factors to be considered. H. L. HUENINK

470. Industrial utilization of the potato. *Chem. Age* 31, 15-16(1923).—The Pacific Starch Products, Ltd., Vancouver, B. C., has become the largest potato purchasing agency in British Columbia. With the completion of its new starch plant the potato growing industry of the Fraser Valley will be assured of an outlet for all grades of potatoes. The starch plant which will commence to operate about Jan. 10, will take about 5,000 tons of potatoes annually. The enormous present and potential potato production capacity of the United States makes the utilization of culls and of the surplus output of the higher grades a matter of considerable importance, particularly in times of great surplus crops of this tuber. In Germany the potato occupies the place that Indian Corn does with us as the primary source of starch. (See *Chem. Age*, Dec., 1920—The Domestic Potato Flour Industry; also September, 1922—Manufacture of White Potato Flour, by W. A. Noel, M. E.). The rest of the article is a statistical description of the potato industry in Germany. There are two tables showing the distribution of potatoes used in Germany, how used, etc., and the production of alcohol from potatoes. It also describes the German potato drying industry and potato starch manufacture. W. W. MURRAY

471. Food value of canned pumpkin. W. S. GIBBS. *Canner*, Mar. 3, p. 128 (1923), (Convention Number); *Trade*, Feb. 12, p. 38(1923), (Convention Number).—Canned pumpkin contains .8% protein, .2% fat, 6.7% carbohydrates, .7% mineral matter and 144 calories heat energy as compared to .5% protein, .1% fat, 2.6% carbohydrates, .3% mineral matter and 59 calories of heat energy in the raw product. Product helps to maintain alkalinity of blood. B. S. Clark

472. **A rapid method for controlling specific gravity of tomato pulp.** L. V. Strasburger. *Canner*, Mar. 3, p. 127(1923), (Convention Number); *Trade*, Feb. 12, pp. 36-37(1923), (Convention Number).—A solvent, immiscible with the pulp and having desired gravity, is made by mixing carbon tetrachloride and varnolene. The working solution is made by placing hydrometer in the varnolene and adding carbon tetrachloride until desired specific gravity is obtained. The test is made by adding one drop of cooled tomato pulp to this solution. If the pulp floats the gravity is too low; if it sinks to the bottom of the vessel the gravity is too high; if it remains suspended in the solution the gravity is right. It is desirable to use a solution having gravity about .002 higher than that desired to allow for change due to evaporation, etc. The method was tried out commercially at the plant of Martin Wagner Company. A solvent of specific gravity of 1.035 used to hold pulp gravity at 1.033. The average by weight determinations was 1.031 with a maximum variation .011. The method is capable of an accuracy to .003 specific gravity as shown by two days personal supervision.

B. S. Clark

473. **Canning-factory tomatoes.** H. D. Brown. Indiana (Purdue) *Agr. Exp. Sta. Bull.* 259, 20 pp., 7 fig. and frontispiece. (1922); *Botan. Abstracts* 12, No. 1, 75 (1923).

474. **Canned tomatoes.** *Brit. Food J.* 25, (1923).—At Southport, England, a dealer was prosecuted for selling a can of tomatoes which public analyst had found to contain 5.5 grains of dissolved tin per pound.

Edwin LeFevre

MARINE PRODUCTS

(*See also number 513*)

475. **Canning of crab meat on the Pacific Coast.** John N. Cobb. *Pacific Fisherman* 21, No. 2, p. 10(1923).—Most of the meat packed so far has been from the "Dungeness" crab (*Cancer magister*), the common crab of this coast. The meat is somewhat yellower than that of the spider crab (*Lithodes Camtciatica*) which is packed by the Japanese. The spider crab also occurs along the Alaskan coast and is being packed to some extent. The spider crab weighs from 8 to 32 pounds while the Dungeness crab weighs from 2 to 5 pounds. Much care is required in packing. Only live crabs, those showing a bubbling at the mounth, should be used. They are placed, alive, in large kettles of boiling water and boiled 40 to 60 minutes. The meat is then picked out, washed in a weak brine, and the water lightly pressed out. It is then packed in cans lined with parchment paper, exhausted for 15 minutes at 210° F., the cans closed and cooked in a retort as prescribed for Dungeness crabs in the Pacific Fisherman for June, 1921. After cooking the cans must be quickly and thoroughly cooled. Ray W. Clough

476. **Protect the halibut during spawning season.** E. A. Wakefield. *Fishing Gazette* 40, 17-31(1923).—A plea for protection of Pacific Coast halibut. C. R. Fellers

477. **A practical oyster purification plant.** W. F. Wells. *Fishing Gazette* 40, 45-47(1923).—This is a description of a practical method of purify-

ing oysters grown in polluted beds by allowing them to remain in electrically sterilized sea water for several hours. The process is simple, inexpensive and efficient. It has been certified by the N. Y. State Board of Health and U. S. Public Health Service. C. R. FELLERS

478. **Oyster culture.** W. M. LEE. *Fishing Gazette* 40, 51-52(1923).

479. **The red snapper fishery of the Gulf of Mexico.** F. W. WALLACE. *Fishing Gazette Ann. Review*, pp. 35-45, (1923).

480. **Smoked salmon in slices.** P. BUTTENBERG. *Chem. Ztg.* 47, 6(1923); *J. Soc. Chem. Ind.* 42, 157A (1923).—Smoked salmon is prepared in Germany from domestic or imported American salmon by soaking the salted fish in water and subjecting it cold to a smoking process. The smoked fish is cut into slices, moistened with olive oil and tinned. A large amount of fish of the cod family is sold as smoked salmon; this is colored with aniline dyes and saturated with edible oils to give it the color and fat content of the genuine fish. The following tests serve to differentiate the two kinds of fish. The finely divided sample is treated with boiling petroleum ether and filtered; salmon gives an orange red filtrate leaving on evaporation an orange red oil (refractometer reading at 40°, 60-62.5) whereas substitutes give an almost colorless filtrate which leaves a light yellow oil (refractometer reading at 40°, 55-57). The dried residue from the extraction with petroleum ether is boiled with a solution of equal parts of alcohol and water and the solution filtered; salmon yields a colorless filtrate, substitutes an intensely orange colored filtrate which remains colored after boiling with yellow mercuric oxide, but which is decolorized by boiling with wool and acetic acid.

481. **A second report on the return of salmon marked in 1915 in Klamath River.** J. O. SNYDER. *Cal. Fish and Game* 9, No. 1, 1 (1923).

482. **Statistics for fish landed in California during the months of July, August and September, 1922.** *Cal. Fish and Game* 9, No. 1, (1923).

483. **Statistics for fish landed in California during the months of October, November and December, 1922.** *Cal. Fish and Game* 9, No. 2, (1923).

484. **Apparatus for the industrial freezing and cooling of fishes and meats.** G. DE HERVE. *E. P.* 167, 501, 6.8.21 Conv., 9.8.20; through *J. Soc. Chem. Ind.* 42, 27A (1923).

485. **Fish marketing surveys of Louisville, Pittsburgh, Chicago, Minneapolis, St. Paul, Seattle and Boston.** *Fishing Gazette Review*, pp. 78-79, (1923).—A review of the U. S. Bureau of Fisheries market surveys in the principal markets of the U. S. C. R. FELLERS

486. **Putting speed into fish freezing.** PAUL W. PETERSEN. *Fishing Gazette* 40, 22-33 (1923).—The various operations incidental to the freezing and refrigeration of fish are discussed. C. R. FELLERS

487. **The methods used for the inspection of canned foods. Part II. Canned marine products.** W. G. SAVAGE. *Special Rep. No. 10*, Mar., 1922.—The subject matter of this report considers the methods employed for the examination of the canned marine products, salmon, herring, sardines, lobster, crab, and crayfish, and the problems which arise in connection with that examination. The basis for rejecting these canned foods comprises inspection, palpation, percussion, and shaking which is similar to that for canned meats. The reliability of this procedure is seriously considered by a comparison of the findings of the expert examiners with the actual physical con-

dition of the fish when the tin is opened and the results of bacteriological and chemical examinations. One hundred and fifty samples were examined by classifying into the three following groups: Group A. Rejected by Trade Examiners but passed by the Food Inspectors; Group B. Rejected as doubtful and unsafe to pass; Group C. Rejected as definitely unfit. In addition to the examination of these rejected samples, 50 shop samples of the same canned marine products, all of which were good, judged by the usual physical tests and all of which appeared good when opened, were submitted to a bacteriological examination. The results show only 42% sterile. The examination of the other samples show that the tins which are unmistakably "blown" are nearly always unfit or contain decomposing bacteria. They would all have to be condemned. In the other groups, the judgment was correct in only about 45% of the cases, and this percentage varied from 32 to 67% for six inspectors. The chief difficulty is a want of correlation between certain physical signs and the condition of the contents. The conclusion reached is that while it is evident that the present methods of procedure result in the rejection of many sound samples, it is difficult to make practical suggestions which will diminish these rejections and yet leave no loophole for the passing of samples which are unfit. Emphasis is placed upon the maintenance of a special central laboratory to enable the control of the methods of the inspectors by complete examinations of samples. This suggestion applies not only to marine products but to all tinned foods including meat, milk and fruit, all of which have special difficulties of their own.

J. R. Esty

MILK AND MILK PRODUCTS

488. **Examination of (determination of fat in) condensed milk.** K. Bauer. *Z. öffentl. Chem.* 28, 197-199 (1922); through *J. Soc. Chem. Ind.* 42, 26A (1923).—Two grams of the sample is diluted with about 400 cc. of water and treated with 10 cc. of Fehling's solution (34.63 g. of copper sulfate in 300 cc.) and 6.5 – 7.5 cc. of a solution containing 10.2 grams of sodium hydroxide per l. The liquid should be neutral or slightly acid when the precipitate has settled. It is filtered and the precipitate washed once by decantation, transferred to the filter and well washed. The precipitate and filter are dried and extracted with ether and the fat weighed as usual. This is the only method found to give accurate results in the case of condensed milks rich in sugar.

H. C. R.

489. **Fats in the evaporated milk industry.** Harper F. Zoller. *J. Ind. Eng. Chem.* 15, No. 3, 278-279 (1923).—A comparison of butter fat to other edible fats to determine their suitability for the production of fat filled skim milk or milk compound.

P. J. Donk

490. **Malted milk.** William Horlick. *Chem. Age* 31, 140 (1923).—A brief description is given of U. S. Pat. 1,466,120 for the preparation of malted milk in a way to impart superior keeping qualities and digestibility.

W. W. Murray

MISCELLANEOUS PRODUCTS

490. Corn oil an example of conservation by the chemist. A. F. SIEVERS. *Chem. Age.* 31 33-34 (1923).—About 75,000,000 pounds of edible corn oil are made annually. S. discusses the history of the industry and describes the methods of manufacture.

491. Syrup from sweet corn stalks. *Can. Chem. Met.* 7, No. 2, 40 (1923).—Extract of report by Dr. J. J. Willaman of Minnesota. A good cooking syrup can be made from sweet corn stalks and can be put on the market and meet competition with molasses. H. H. HOWRY

492. How salt is made. J. E. SHIELDS. *Pacific Fisherman* 21, No. 2, p. 12 (1923).—Most of the salt used on the Pacific Coast is made from the ocean and principally around San Francisco Bay. The salt water is allowed to evpaorate in shallow dyked fields and pumped from one field to another gradually increasing in density and losing by crystalization various impurities such as calcium sulphate, magnesium sulphate, sodium sulphate, magnesium chloride, and potassium chloride. One hundred tons of sea water will produce two and one half tons of refined salt. RAY W. CLOUGH

493. Present abuses in the spice trade. C. GRIEBEL. *Z. Nahr. Genussm.* 45, 52-60 (1923).—The author discusses the adulteration of spices. Pepper was found adulterated with corn flour, wheat flour, extracted ginger, sawdust and ivory-nut flour. Foreign plant materials and sand are used in cinnamon. Corn meal and turmeric are adulterants for paprika. Ground cardamom shell was found in the cardamom powder. R. H. LUECK

494. A review of the manufacture of fermented vinegar and apple juice. PAUL HASSACK. *Am. Vinegar Ind.* Mar., pp. 3-6 (1923).—A lengthy discussion on progress being made in manufacture of fermented vinegar and apple juice. Continued. E. H. WIEGAND

495. A review of the manufacture of fermented vinegar and apple juice (Cont.) *Am. Vinegar Ind.*, Apr. 2, pp. 3-5 (1923).—The saturation of vinegar generators should be done slowly and it is of advantage to employ vinegar warmed to a temperature of about 90° F. in saturating. Some practical points of factory construction are: 1. floors and walls of generator room should be protected against corrosive action of vinegar vapors; Par-o-lac considered good; 2. centrifugal pumps recommended; 3. all fittings made of hard rubber; 4. large generator most efficient. Vinegar eels only parasite—harmless. Filtration should be applied. Hydraulic pressing is most advanced method. Gravity plan used in layout of cider mill.

ERNEST H. WIEGAND

496. A review of the manufacture of fermented vinegar and apple juice. PAUL HASSACK. *Am. Vinegar Ind.* May 2, pp. 3-4 (1923).—The pomace in rational execution of method should be charged through a pomace picker, subjected to a second pressing, loosened up, charged to a rotary dryer and dehydrated while it is in a perfectly fresh state. Dried pomace is a valuable commercial product to be used for cattle fodder, worked into pectin products or utilized for making jams and jellies. Juice yield varies with extract contents. Methods of improving appearance of cider are: 1. centrifugalizing the fresh apple juice, followed by filtration through a pressure paper pulp, or gravity asbestos filter or by means of a Kieselguhr filter press; 2. processing the cider by certain efficient and practically approved fining agents which are to be added in correct proportions immediately when the process tank is filled. ERNEST H. WIEGAND

497. Legal chemistry of vinegar (Cont.). R. O. BROOKS. *Am. Vinegar Ind.*, Mar. pp. 9-10; Apr. 2, pp. 9-10 (1923).—Spirit, distilled or "grain" vinegar is the product resulting from the acetic fermentation of a weak alcoholic spirit distilled supposedly from an alcoholic fermented mash of malted or otherwise prepared cereal substance. The true sugar vinegars have not undergone any distillation process. The Federal standard for spirit or distilled vinegar specifies it as the "product made by the acetous fermentation of dilute distilled alcohol, and contains, in one hundred (100) cubic centimeters (20°C.), not less than four (4) grams of acetic acid." The usual strength at which spirit vinegar is sold by the manufacturers is 90 "grains" (9% acetic acid). The Federal standards provide for a "glucose vinegar," the "product made by the alcoholic and subsequent acetous fermentation of solutions of starch sugar or glucose, is dextrorotatory, and contains in one hnudred (100) cubic centimeters (20°C)., not less than four (4) grams of acetic acid." Successful attempts have been made at making vinegar from prunes, pineapple juice and a solution of honey. E. H. WIEGAND

498. Found—still another use for vinegar. *Am. Vinegar Ind.*, Apr. 2, p. 22 (1923).—Vinegar may be used for recharging electric batteries.

499. "Spumex" an inorganic (mineral) generator packing of volcanic origin. PAUL HASSACK. *Am. Vinegar Ind.*, Jan., pp. 12-14 (1923).—The name of the mineral used for this purpose is "Spumex," a very porous, froth-like volcanic glass. It is an igneous rock which in its original stage was completely liquid lava at the time of eruption and was so rapidly cooled that there was no time for it to crystallize. The structure of natural "Spumex" is made up of pure, complex compound of aluminum, potassium and sodium silicate; free of metallic impurities, light gray, tasteless, odorless and insoluble in acids and alkalies, and nonconductor of heat. It is unchangeable under boiling, super-heated steam or furnace heat. E. H. WIEGAND

500. Hard rubber equipment for the manufacture of fruit juice and vinegar products. R. O. BROOKS. *Am. Vinegar Ind.*, Jan., pp. 15-17 (1923).—Fruit acids, such as malic acid, citric acid and tartaric acid, attack metals. Acetic acid has strong corrosive and dissolving action on various metals and causes food products to become dark. Hard rubber solves problem of all needs for acid-proof equipment. E. H. WIEGAND

501. To pasteurize does not mean to boil. J. H. IRISH. *Pacific Bottler* 43, Feb., 16-17-46 (1923).—Pasteurization consists of raising the temperature of the product to a degree sufficiently high to kill all living organisms and holding it there for a period of thirty minutes, especially in the case of carbonated beverages. Products thus treated will keep indefinitely, so long as the seal is not broken. The method of pasteurization of carbonated beverages and syrups differ. The beverage must be carbonated in the bottle, sealed and pasteurized in the bottle to prevent loss of carbon dioxide gas. Bottles are placed in pasteurizer in cold water, the temperature of which is gradually raised to 150° F., and this temperature maintained for thirty minutes. If temperature is increased suddenly the percentage of breakage will be high.

Allow twenty minutes for temperature to reach 150° F., and twenty minutes for cooling. E. H. Wiegand

502. **Viner sheds and their equipment.** *Canning Age.* Jan., p. 22-26 (1923).—In Wisconsin there are three general types; (1) open, (2) closed, and (3) closed, with large door or other openings by which it can be converted to the open type. The open type offers the advantages of being cool, light, airy, and easily cleaned; but has the disadvantages of exposing machinery to elements, and allowing chaff to be blown about on windy days. The closed type can be shut when not in use and used for storage out of season, but is often dark and damp and has corners in which ensilage is allowed to collect. The combination type has all the advantages of both open and closed types and none of the disadvantages. It is more economical to have the shed near the main factory building on account of the shorter distance to convey the shelled peas. Separate motors result in economy when all machines are not used continuously. Where cleaners are mounted on elevated platforms one man can generally be eliminated by use of an elevator conveyor. Economy of floor space can be effected by placing cleaners and washers on a balcony. When floor pits are used for washers a depth of a few inches is better than several feet. Ensilage conveyors should be high enough for workmen to pass underneath easily. Viners should be driven by variable speed pulleys in order to get greatest efficiency and best quality from vines of different degrees of maturity. H. L. Huenink

FOOD ANALYSIS AND NUTRITION

(*See also numbers 445, 447, 450, 454, 460, 467, 471, 472 and 488*)

503. **Storage of vitamin A in the body.** *J. Am. Med. Assoc.* 80, 851 (1923).—American investigators, including Osborne, Mendel, Sherman and Kramer, find great variation of vitamin A and C content in milk, depending on the feed of the animal. Evidence regarding vitamin B is still conflicting. Sherman and Kramer find that storage of vitamin A in the body enables animals, particularly when young; to grow for some time on diet free of that vitamin. This fact is important in feeding experiments and in diet of vitamin A content of different foods. H. M. Loomis

504. **Quantitative aspects of the role of vitamin B in nutrition.** F. B. Osborne, L. B. Mendel and H. C. Cannon. *J. Biol. Chem.* 54, 739-752 (1922); *J. Soc. Chem. Ind.* 42, 158A (1923).—From experiments on rats it is concluded that the requirements of an animal for vitamin B are quantitatively related to the mass of active tissue in its body. E. S.

505. **Synthesis of water-soluble (vitamin B) by yeast grown in solutions of purified nutrients.** M. B. MacDonald. *J. Biol. Chem.* 54, 243-248 (1922); through *J. Soc. Chem. Ind.* 42, 113A (1923).—Using five different varieties of yeast, the author confirms the conclusion of Nelson, Fulmer, and Cessna. (J. 1921-316A) that this organism is able to synthesise vitamin B. E. S.

506. **The protection of vitamin C in foods.** Edward F. Kohman. *J. Ind. Eng. Chem.* 15, No. 3, 273-275 (1923); *Trade*, Mar. 12, pp. 22-26 (1923).—A review of studies dealing with the stability of vitamin C toward heat and oxygen. The review outlines work done by other investigators and additional work carried on by the author. It has been definitely proven that oxygen has a marked destructive action on vitamin C while foods containing

it are heated. Means for eliminating oxygen from dissolved gases or entrapped gases in different foods are outlined. Tables are given showing the gases obtained from different foods and also the rate at which vitamin C is destroyed under different conditions. P. J. DONK

508. **Factors affecting the quality of dehydrated products.** *Am. Vinegar Ind.* Jan., pp. 18-20 (1923).—Statement issued by the U. S. Dept. of Agr., Bureau of Chemistry, and Commercial Dehydration Laboratory. Various factors affecting the quality are discussed. E. H. WIEGAND

509. **Chemical preservatives in food.** DR. REGINALD DUDFIELD. *Brit. Food J.* 25, 32 (1923).—Attention is directed to the widespread use of these preservatives in England—their varied character and the extraordinary ranges in quantities added by various manufacturers. All the preservatives discovered to be in use are drugs, for the majority of which the British Pharmacopoeia lays down limits for use in prescriptions. Admitting that the quantity of the drugs used for preserving taken with any food usually falls notably below the maximum dose laid down by the Pharmacopoeia, it is to be remembered that (1) certain individuals manifest an intolerance to certain drugs; (2) the effect of drugs used as preservatives on the human system, particularly in the digestive tract, is still an undetermined question; (3) the action of some drugs is known to be cumulative; and (4) sick persons and young children are particularly affected by the majority of the drugs used as preservatives. EDWIN LEFEVRE

510. **Germicidal efficiency of a boric acid canning compound.** MAX LEVINE and J. C. WELDIN. *Abstracts Bact.* 7, 5 (1923).

511. **The value of boric acid canning compound in food preservation.** MAX LEVINE. *J. Home Econ.* 15, No. 2, 64-70 (1923).—A "canning compound" now on the market and consisting of boric acid 95% and salt 5% was studied. A selective antiseptic action was noted and some spore forming aerobes were inhibited. The colon forms associated in the past with food poisoning and anaerobic spore formers including Cl. botulinus grew readily in the concentration of compound recommended. Cl. botulinus grew in twice the concentration and survived three times the period of boiling recommended for canning with the compound. H. H. HOWRY

512. **Potential dangers in chemical preservatives.** *J. Am. Med. Assoc.* 80, 1073 (1923).—Editorial based on work of Levine. (See abstract No. 511).

513. **Note on the sulphuric acid test for fish liver oils.** NORMAN G. EVERS and H. J. FOSTER. *Analyst* 48, 58-60 (1923).—A general discussion of experimental work done on the technique of the sulphuric acid color test for fish liver oils, and other oils rich in vitamin A. E. J. DASHNER

514. **Canned foods in relation to health.** Lectures before Royal College of Physicians by DR. WILLIAM G. SAVAGE, *Brit. Food J.* 25, 22 (1923).—Statistics for English importations of canned foods in 1921 are given. The reliability of methods of detecting unsoundness from examination of unopened tins demands consideration. After opinions of the food inspectors had been elicited, 431 samples of different canned foods were submitted to bacteriological examination. The results showed that judgment was correct in 73% of the samples, but this varied greatly and for meat was as low as 41%. For tins which were springy or showed any abnormal shake sound the percentage of error was very high and many tins with sound contents were rejected. Author is strongly of the opinion that the date of preparation should be

stamped on all tins. Loss of canned foods by contents becoming unsound falls into two groups, factory loss and post factory rejections. In the former anything over 0.5% would be unwarranted and demand strict investigation. Of 178 sound samples purchased in shops 38.8% were not sterile excluding sweetened condensed milk which is never bacteria free. More important than absolute sterility is the type of bacteria present. The two important points in determining the potential ability of an organism to cause unsoundness in canned foods are its proteolytic and fermentative activities. Organisms such as B. proteus or the obligate anaerobes which possess both groups of properties, are the most potent cause of decomposition. Those which are fermentative but not proteolytic such as the B. coli group will cause tins to become "blown" but may cause surprisingly little change in contents. The micrococci are comparitively harmless. B. subtilis and B. mesentericus are often present in spore form in all types of canned foods sound and unsound and while they usually remain dormant, under certain conditions can decompose the contents. They are not fermentative but the majority are proteolytic. Experiments have shown that many sound tins contain bacilli, even of the decomposing type, which remain dormant until revived to activity by air access. This applies even to anaerobes. Experiments have demonstrated that a few yeasts of the fermenting type may be present in sweetened condensed milk and cause no decomposition so long as supply of oxygen is restricted. Once they have produced sufficient enzymes, however, gaseous fermentation will be largely independent of oxygen supply. A new and hitherto unrecognized type of decomposing bacillus, B. pleofructi, was isolated and is believed to be an important factor in the spoilage of fruit. Keeping down the initial number of bacteria before the tin is closed is of much importance. The destruction of bacteria is materially affected by physical properties of the food. The hydrogen ion concentration, size of tins, and initial temperature are factors mentioned. The problem of processing is one of great complexity and is not merely a question of a definite temperature for a given time. In spite of prolonged investigation no satisfactory method could be devised for determining whether incipiently decomposed food had been used in canning. Certain chemical determinations are, however, of value and are capable of improvement. Fortunately there is no evidence that the consumption of such tainted food is liable to set up disease or illness. Experiments on kittens fed repeatedly upon both slightly and very putrefactively canned food failed to demonstrate any definite degrees of toxicity. No danger from this source is to be apprehended provided the specific organisms of food poisoning are absent. The bacterial sources of infection are mainly specific food poisoning from the salmonella group, botulism, and the possibilities of food poisoning from the use of putrefactive food not specifically contaminated. Salmonella food poisoning is of great importance in connection with canned food. Particulars in 51 such outbreaks, all in Great Britain, were collected. Canned foods infected in this way do not differ in appearance, odor, or taste from sound foods, nor are there any changes in the containers. There are two groups of this form of poisoning, in one the living members of the Salmonella group are present, in the other heating has killed the living bacteria and left the heat-resisting toxin. Of 43 outbreaks in which this could be determined, 16 were due to living bacteria and 27 to undestroyed toxins without living bacilli. In author's series the canned food vehicle percentages were respectively meat 51, fruit 10, salmon 31, other marine foods 8. The prevention of outbreaks from this cause is therefore a matter of exposure of the tins to a temperature adequate to kill toxins as well as bacilli, and in part to prevention of infection of the food at the source. In so far as can be traced only one outbreak of botulism, that at Loch Maree, has occurred in England. Fortunately with this organism products of growth are unpleasant and definite signs of spoilage are present. In exceptional cases these have not been noted. In the Loch Maree outbreak the wild duck paste from its nature would mask such changes although probably noticeable to an expert. The risk of botulism is a real but extremely small one and with added care will be still further diminished. Tin poisoning from canned foods is a popular rather than a real danger. It is not possible to give a direct answer to questions as to whether vitamins are present in canned foods as so many factors are concerned. The whole complex of changes which are necessary in canning foods is detrimental to their content in vitamins. Type A is comparatively heat stable and there may be no material diminution in content of this vitamin. Type B is more thermolabile and with any considerable application of heat is likely to be dangerously reduced or entirely destroyed. Considering the subject broadly, the conclusion is reached that while canned foods have definite and special risks of their own, these are not large and are for the most part readily guarded against. They are undoubtedly safer than fresh foods and the popular prejudice against them is not justified. Certain improvements in manufacture, distribution, care, and supervision are necessary but these are not very considerable. No one who has studied the subject can be left in doubt as to the very great value to the community of canned foods. EDWIN LEFEVRE

515. The preservative effect of allyl mustard oil. ALEXANDER JANKE. *Am. Vinegar Ind.* Mar., pp. 17-18 (1923).—Allyl mustard oil obtained from the firm of Kahlbaum (Adlershof, Berlin) was diluted in the first place with 96% alcohol to obtain a 1:100 parts solution, and the latter further diluted by distilled water to furnish a 1:1000 parts solution. The liquids subjected to experimentation received percentage additions of this one per thousand diluted solution of allyl mustard oil and were inoculated with mycodermae vini and acetic acid bacterium IV.6. of the Hansen group. The limit for suppressing the development of the mycoderma by allyl mustard oil was about 0.006% and for the acetic acid bacteria about 0.008%. E. H. WIEGAND

BACTERIOLOGY

516. **The heat resistance of B. botulinus spores.** J. R. Esty. *Am. J. Public Health* 13, 108-113 (1923).—Here is presented the procedure and results of a study to establish the maximum period of survival and death of B. botulinus at diferent temperatures. The thermal death point of B. botulinus is based upon that of the most resistant strains. The determinations were made under the most favorable conditions for spore production and with optimum recovery of the heated spores. Two tables of experimental data are given. Table 1 is a record of minimum, maximum, and average resistance in minutes at 105° C. (221° F.) of type A and B strains. Table 2 is a record of the time in minutes at 105° C. (221° F.) of thermal resistance at different concentrations of B. botulinus spores. Among the results obtained it is shown that the spores of B. botulinus vary in their thermal resistance not only between different strains but also within the same srain.
W. D. Grimmer

517. **The identification of B. botulinus and its toxin in culture and in canned food stuffs by serological methods.** R. A. Kelser. *Am. J. Pub. Health* 13, 366-376 (1923).—This series of experiments was undertaken in order that a means of identification of the bacillus botulinus might be facilitated. As a result it has been proved that B. botulinus can be identified by means of complement fixation titrations. This method of identification offers a means of making an early diagnosis of a suspected outbreak of botulism.
W. D. Grimmer

518. **Epidemic of botulism.** B. R. Corbus, M. Wells and F. P. Currier. *J. Am. Med. Assoc.* 80, 1805 (1923).—Report of outbreak of botulism involving 29 persons of which three died, who had eaten canned spinach from which type A botulism was isolated.
H. M. Loomis

519. **The differential staining of live and dead spores of Clostridium botulinum.** G. S. Burke. *Abstracts Bact.* 7, 5 (1923).

520. **Important considerations in the relation of food to disease.** J. C. Geiger. *Am. J. Pub. Health* 13, 10-14 (1923).—Food acts as a poison under the following conditions: (a) poisonous in itself, (b) because of growth of organisms, (c) dangerous source, (d) idosyncrasies, (e) faulty preparation. Botulism is discussed. A consideration of dietary deficiencies is also given.
W. D. Grimmer

521. **A toxin-producing anaerobe isolated principally from fly larvae. Its relation to the organisms hitherto known to be causative factors in the production of botulism.** Ida A. Bengtson. *Pub. Health. Rep., Wash.*, 38, 340-344 (1923).—The organism in its cultural aspects resembles the B. botulinus of von Ermengen more closely than the ordinary American type A and B in that it is non-proteolytic or possibly, feebly proteolytic. Though the toxin produces the same effects in laboratory animals as the toxin of types A and B, it is not neutralized by the antitoxins of either of these types and conversely the antitoxin of the new types fails to neutralize the toxins of types A and B. The name B. botulinus type C is therefore proposed for the new type.
I. A. B.

GENERAL

522. **Ammonia as a refrigerant II.** W. H. Motz. *Can. Chem. Met.* 7, No. 1, 7-11 (1923).—Concluding number of a detailed study of fundamental data relative to all factors in the operation of compression refrigerating systems.
H. H. Howry

523. **The relation between pressure, temperature and fermentation: 1 The effect of pressure on the velocity of fermentation hydrolysis, by pepsin, trypsin and diastase.** S. Frankel and G. Meldolesi. *Biochem Z.* 115, 85-95 (1921); through *Z. Nahr. Genussm.*—Fermentation processes were studied under varying pressures, particularly the action of trypsin and pepsin on blood albumin and that of diastase on arrowroot starch. A sample of the mixed substrate and ferment was divided in two parts; one part being held in a thermostat under atmospheric pressure, 5, 10 and 15 atmospheres of carbon dioxide or nitrogen. It was shown that under a pressure of 5 atmospheres there was an initial acceleration of the hydrolysis. This later fell off considerably but still remained distinctly noticeable. Under 10 atmospheres pressure there was likewise an acceleration in the beginning but less than at 5 atmospheres. This later decreased but the velocity remained greater than at atmospheric pressure. The velocities measured were independent of the gas creating the pressure. (Abstractor's Note.—These facts may have some bearing on enzymic spoilage in canned foods in hermetically sealed containers).
R. H. Lueck

524. **The food research institute.** Stanford University, 1922-23. Foundation. *American Grocer,* Mar. 7th, p. 5 (1923).—A reprint of the annual report of the institute describing the organization, general policies, research work in progress and publications; also giving names of advisory committee and staff.
T. W. Morgan

525. **Diatomaceous earth.** *Chem. Age.* 31, 68-69 (1923).—This is a brief description of the large deposit of diatomaceous earth which is mined near Lompoc, Cal. This deposit is owned by the Celite Products Company of Los Angeles and used in the production of filtering material by the Celite Products Co.
W. W. Murray

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ABSTRACTS OF CANNING TECHNOLOGY

Editor: W. D. BIGELOW, *Director of Research Laboratory.*
Associate Editor: A. E. STEVENSON

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FACTORY CONSTRUCTION AND EQUIPMENT

(*See also numbers 541, 565, 578, and 579*)

526. Continuous plant handles salmon offal. *Pacific Fisherman* 21, No. 6, p. 14(1923).—A description of the fish reduction plant manufactured by Stanley Hiller, Inc., located in Seattle and employed on halibut heads, salmon heads and backbones, difficult material but successfully handled.

RAY W. CLOUGH

527. Integral waterproofings for concrete. A. H. WHITE. *Ind. Eng. Chem.* 15, 150-53(1923); through *C. A.* 17, 864(1923).—Some of the reaction products of the hydration of cement are colloidal and these remain in this condition for at least 20 years. When concrete is in contact with water, the colloids take up water and swell, thereby causing the concrete to expand and at the same time preventing more water from entering. When concrete dries out the reverse process takes place and there is a corresponding contraction. Water coming to the surface contains calcium hydroxide in solution. In presence of carbon dioxide in the atmosphere, this calcium hydroxide becomes calcium carbonate and seals the ends of capillary openings of the concrete, thus acting as a waterproofer. At the University of Michigan the effect of several waterproofing compounds on 4′ by 4′ by 6″ specimens (1:3 mortar) was studied. The compounds were hydrated lime, clay, petroleum residua and insoluble soaps. The results indicate lime and clay should not be considered as waterproofing agents. Oil decreases the absorption, but an objection to its use is that in time some of it comes out of the concrete. Insoluble soaps decrease the absorption and frequently decrease the strength also. In some cases however, specimens containing small amounts of insoluble soaps show increased strength. Such a specimen when stored in air dries out more slowly than an untreated specimen, and the water is therefore retained for a longer time, thus favoring the formation of colloids and a corresponding increase in strength. J. C. WITT

528. **Cannery lighting through saw-tooth roof.** *Canner*, Jan. 20, p. 27 (1923).—Modern canneries are being designed so as to supply the maximum amount of daylight for the important operations of trimming, sorting, etc. The saw-tooth roof is the best construction where light and ventilation are of importance. Descriptions are given of other modern features of Colorado canneries which are exceptionally well arranged and equipped.
J. E. McCONKIE

CONTAINERS

(*See also number 552*)

529. **Chemistry in relation to tinplate manufacture.** H. J. BAILEY. *Chemistry and Ind.* 42, 362-5(1923); through *C. A.* 17, 1940(1923).—Annealing, pickling and tinning are discussed.

530. **Standardizing tin and glass food containers.** A. W. BITTING. *Canner*, Jan. 20, p. 33(1923).—A brief outline of the efforts to standardize tin and glass food containers in the past and a statement of the need for such standardization for the economic production of canned foods. J. E. McCONKIE

531. **A rapid method of testing the durability of glassware.** H. S. BLACKMORE, VIOLET DIMBLEBY, AND W. E. S. TURNER. *Chem. News* 126, 3286(1923).—A solution of 1 part of narcotine hydrochloride in 1000 parts of water is placed in the glass vessel to be tested. The solution is brought to boiling. If the glass is of poor quality, the precipitate of the alkaloid thrown out of solution may be seen. J. H. BUCHANAN

532. **Kraut containers.** *Canner*, Mar. 10, p. 46(1923).—A booklet "A Memorial and Petition" published by the National Kraut Packers Association, gives reasons in technical terms why cleanliness of kraut containers is important for a high quality product. J. E. McCONKIE

FRUIT AND FRUIT PRODUCTS

(*See also numbers 583, 585, 586 and 587*)

533. **Northwestern method of canning apples.** *Canner*, Jan. 20, p. 35 (1923).—The "solid" or "dry" pack apple of the Northwest appears to be gaining in public favor and Eastern apple packers are experimenting upon it. In general the Northwestern method is as follows: "After peeling, trimming, and coring the fruit, it is put in brine and soaked from six to twelve hours to firm and whiten it. It is then run through the blanch, either steam or hot water, to soften it somewhat, in order that it will pack into the cans. The cans are then filled by weight to produce fairly uniform contents. After filling they are put through the exhaust box in the usual manner at a high temperature, then sealed and processed." The length of time of the various processes varies with the packer and equally good results seem to be obtained over wide ranges of time. Northwestern "dry" pack average 96 ounces drained weight as compared to 70 to 80 ounces when packed by the Eastern method in No. 10 cans. J. E. McCONKIE.

534. **Revised specifications for California apricots and peaches.** *Canner*, Jan. 20, p. 30(1923).—Standardized specifications for canning apricots and peaches as adopted by the Southern California Canners Bureau are given.
J. E. McCONKIE

535. The drying of cherries and loganberries. F. B. GUTHRIE. *Am. Fruit Grower.* June, pp. 5-30(1923).—Tunnel driers are used for making evaporated fruits. Cherries are dried in trays made to fit on cleats in the tunnels. Formerly only pitted cherries were used but now the cherries are just stemmed. Loganberries are dried and processed the same as prunes. E. H. WIEGAND

536. Fresh figs must be harvested with care. W. B. BROWNING. *Associated Grower* 5, July 14(1923).—Figs are the most perishable and most easily damaged of all fruits and must be handled with great care. They are most satisfactorily removed from the branch by a short sharp twist of the fig. The use of cotton gloves is desirable. Figs should be picked directly into the container in which they will be delivered to the cannery and under no conditions should they be transferred from one container to another. Prompt delivery at the cannery is essential and all unnecessary exposure to sun and dust should be avoided. Figs are easily bruised by rough handling and for this reason great care is necessary that in hauling they are subjected as little as possible to sudden jolts or jars. Trucks of two to two and one-half tons capacity, equipped with pneumatic tires and loaded to full capacity will carry figs to the cannery in the best condition. C. A. MAGOON

537. Olive pickling studies at the California Station. *Cal. Sta. Rpt.* pp. 181-182(1922).—The softening of olives at the stem end during sterilization was found to be due to incomplete penetration of the lye during pickling. Directions for prevention are given in *Bul. 333* of this station. The fermentation and softening during pickling was found to be due to bacterial action from infected vats; the fermentation may be prevented by the use of water at 60° F. or below or by heating the olives and wash water to 175° F. for 30 minutes. P. L. GOWEN

538. Dried prunes in cans. *Canner,* Jan. 20, p. 36(1923).—Dried prunes are now being packed in tins by a special vacuum process. The product is tender enough to be eaten like dates and requires half the usual time of preparation for the table. J. E. MCCONKIE

539. The antiscorbutic potency of strawberries. C. A. SMITH, OLAF BERGEIM AND P. B. HAWK. *Proc. Soc. Exptl. Biol. Med.* 19, 22(1921); through *C. A.* 17, 126(1923).—Several guinea pigs were fed a diet of oats, milk, and hay until they developed a pronounced attack of scurvy. The daily addition to the diet of 10 cc. of strawberry juice caused the symptoms to disappear within 7 days. Juice previously boiled for 5 minutes had the same curative effect. Strawberries appear to be relatively rich in vitamin C.

540. Dehydration. *Cal. Sta. Rpt.* pp. 185-187(1922).—A compilation of statistics on the development of dehydration in Cal. It was shown that the cost of dehydrating apples in the modern dehydrators is very little greater than kiln drying and gives a very superior product. A study of the methods for the dehydration of cherries indicated that the best results are obtained by dipping for a short time in boiling lye solution as with prunes, following this with 15 minutes sulfuring for light varieties only and then dehydrating for 8 hours at a temperature decreasing from 210° F. to 170° F. The total shrinkage is reported to vary from 3:1 for unpitted black Tartarians to 5:1 for Royal Annes. This method is particularly suitable for canneries or fruit packing houses for the utilization of cherries that are cracked, overripe or bruised, but otherwise sound. The dehydrated cherries are said to be of attractive color and flavor. Dates containing too much moisture for carton packing may be reduced to the proper moisture content by placing them in an air-blast dehydrator for a few hours at 150° F. This treatment is said not to injure the color or flavor of the dates. In the preparation of pumpkin flour by shredding the pumpkin, steam blanching on trays for 5 minutes, dehydrating until crisp, and then grinding to a flour, it has been found that the drying time can be cut down to 6 hours if a finishing temperature of 185° F. is used in place of the usual practice of from 8 to 15 hours at a temperature of 110° to 160°. It is concluded that prunes equal or superior in quality to sundried may be produced as economically in dehydrators as by sundrying. The most satisfactory method of drying has been to enter the trucks of lye-dipped prunes on slatted trays at the cooler end of the dehydrator, 120-140°, and move them towards the hotter, 165° F., the whole process requiring 24 hours. A vigorous flow of air (500-800 lineal feet per minute between trays) at a relative humidity of from 30 to 40 % at the highest temperature should be used. The total operating cost in three typical plants in 1921 is given as $4.49, $4.72, and $3.81. Two of these plants had a total capacity of 10 tons a day and the third of 50. P. L. GOWEN

541. **Fruit evaporators use oil successfully.** *Evaporator* 15, Apr. 1-2 (1923).—This article reports the successful use of oil as a substitute for coal in the evaporator furnaces of western New York. The oil is atomized in a specially constructed combustion chamber and the degree of heat is controled by the regulation of the air blast. The only alteration in the furnaces required is the removal of the grates and ash pit doors. The heat is greater than that developed by coal, and as a brisk steady fire is maintained at all times, from four to six hours on each drying is saved over coal. The product is said to be cleaner and more uniform than where coal is used.

C. A. MAGOON

542. **Factory studies of factors claimed to affect perforations.** H. A. NOYES. *Canner*, Mar. 10, p. 27(1923).—Among other factors affecting perforations are the character of the tin plate, the amount of gas present and the kind and amount of acid present in the product. Preliminary observations in various factories seem to indicate that perforations may be largely eliminated by running the process so that every can gets its proper pack and proper exhaust. Experimental data given show why large variations in drained weight, perforations, and quality of the same pack, may be expected under present factory practice of exhausting. No definite recommendations are given as to changes in the exhaust systems now in use. Many factors affect the efficiency of the exhaust among which are kind and quality of fruit, preparation of fruit for can, filling the can, method and time of exhaust, and factory irregularities due to breakdowns. J. E. MCCONKIE

543. **Some things the Bureau of Plant Industry is doing for the fruit canner.** W. A. TAYLOR. *Trade*, Feb. 12, pp. 54-56(1923), (Convention Number); *Canner*, Mar. 3, p. 147(1923), (Convention Number).—The bureau has been active in research along four particular lines: (1) Development of new varieties of certain fruits, which will meet the requirements of a good canning fruit better than any varieties known at present. Work on peaches, strawberries, and raspberries has met with a considerable measure of success. (2) Investigation of fruit diseases which attack fruits either when in the field or during the processes of packing, transporting, and storage. The eradication of the latter class of diseases appears to lie mainly in the control of methods of picking, handling, and storage. (3) Relation of storage and handling to the canning of fruit. Cold storage of certain fruits—*e. g.*, California Bartlett

pears—is a successful method of materially lengthening the canning season. (4) Study and introduction of canning fruits from other lands. Three fruits with promising futures in canning are the Chinese bush cherry, the loquat, and the mango. C. O. BALL

544. **Fruit salad that will slice.** *Canner*, Mar. 17, p. 37(1923).—California canners of fruit salad have begun packing it in gelatin so that it may be sliced. Otherwise the product is the same as the salad first packed. J. E. MCCONKIE

545. **Preparation and canning of fruit juices and syrups.** J. H. IRISH. *Canner*, Feb. 3, p. 27(1923).—The production of fruit juices and syrups is recommended as a means of prolonging the canning season and reducing the overhead in regions where the fruit is available. A number of fruit juices and syrups are described and the general method and equipment necessary for their production is given. Concentration in vacuum and by freezing is briefly discussed as well as preservation under the heads of addition of chemical preservative and pasteurization. J. E. MCCONKIE

546. **Fruit beverage investigations.** W. V. CRUESS AND J. H. IRISH. *Univ. of Cal. Agr. Exp. Sta. Bul. 359.*—The following conclusions are given: (1) Most of the so-called fruit beverages now on the market contain little or no fruit juice. (2) Excellent syrups and carbonated beverages may be made from loganberries, raspberries, oranges, lemons, and apples, and from blends of strawberries with blackberries, of Muscat with red wine grapes, of raisins with oranges and lemons, and of loganberries, red grapes or pomegranates with oranges and lemons. (3) Sugar was used in the preparation of all syrups except those made from grapes and apples. (4) Concentration by freezing and in a glass-lined vacuum pan were both satisfactory methods of concentrating grape, apple, and citrus fruit juices. (5) Syrups were preserved satisfactorily by pasteurizing in glass at 175° F. for 30 minutes, or by storage at 0 to 15° F. in sealed containers without pasteurization. Glass containers were better than enamel-lined tin containers for pasteurized syrups. Preservatives imparted a disagreeable flavor and their use is not recommended. (6) The syrups were found excellent for the preparation of carbonated bottled beverages, for soda fountain use, the preparation of centers for candies and for home use for the preparation of punch, gelatin desserts, sauces, jellies, etc. (7) Loganberry, grape, strawberry-blackberry blend, apple, raspberry, and fruit punch bottled carbonated beverages have retained their flavor and color satisfactorily for from 6 to 15 months. Orange, lemon, and strawberry deteriorated markedly in quality after 2 months' storage. (8) Pasteurizing at 150° F. for 30 minutes destroyed yeasts and prevented spoiling of carbonated fruit beverages heavily inoculated with yeast, mold, and bacteria. Heat resistant molds and bacteria were not killed by this treatment, but the carbon dioxide gas prevented their development. (9) Many commercial bottlers possess all necessary equipment for preparing carbonated beverages from fruit syrups. Some bottlers do not possess pasteurizing equipment, but this esuipment can be built or purchased at moderate cost. (10) As a result of the investigations reported in this bulletin the writers are convinced that carbonated fruit beverages can be made and sold at retail for ten cents a bottle with a profit to all concerned. Our semi-commercial manufacture and sales have demonstrated that a market exists for them. A good demand for the syrups for home use was found. The writers recommend that the syrups be prepared in centrally located factories and distributed in pasteurized form or under refrigeration to bottlers, soda fountains, and grocers. (11) A large

proportion of the surplus and cull fruits of California might be utilized to advantage in the preparation of fruit syrups and carbonated beverages. Reccommended processes of manufacture are shown graphically. P. L. GOWEN

547. **The antiscorbutic property of fruits. An experimental study of apples and bananas.** M. H. GIVENS, H. B. CLUGAGE, AND E. G. VAN HORNE. *Am. J. Diseases Children* 23, 210-25(1922); through *C. A.* 17, 576 (1923).—Raw apples and raw bananas are antiscorbutic agents. Exposure to temperatures such as used for drying or canning leads to a very marked loss of antiscorbutic power. Cooking bananas 15 minutes at 100° destroys this power; cooking in the presence of dilute citric acid left some intact. S. AMBERG

(Note by editor:—There is no reason to believe that the cooking given during canning causes greater loss or in some cases as great a loss of the antiscorbutic vitamin as household cooking.)

548. **Some observations on pectin.** J. C. BROWN. *Am. Vinegar Ind.* June 2, 14-15-22(1923).—An impure pectin solution can be obtained by boiling fruits which contain pectin in water for from 20 to 30 minutes. The impurities occurring in this pectin solution are sugar, starches and acid. The sugars can be removed by leaching processes before extracting with hot water. The sugars have also been successfully removed by fermentation processes. The starches can be removed by using a diastatic enzyme. A good jelly should have approximately 1% pectin and 65% sugar in the finished product. The stock from which the jelly is made should have a pH value of 3.4.

ERNEST H. WIEGAND

VEGETABLES

(*See also numbers 592 and 599*)

549. **String beans "packed like asparagus."** *Canner*, Jan. 27, p. 32(1923).—String beans, with the ends snipped off, are being packed so that they stand straight up in the can instead of being thrown in at random.

J. E. MCCONKIE

550. **Processing of corn.** W. D. BIGELOW. *Canner*, Mar. 3, p. 169(1923), (Convention Number); *Trade*, Feb. 12, p. 66(1923), (Convention Number).—The minimum processes sufficient to destroy B. botulinus in canned corn, assuming that the initial temperature of the corn is 180° F., are as follows: No. 2 cans, 65 minutes at 240° F. or 55 minutes at 245° F. or 50 minutes at 250° F.; No. 10 cans, 160 minutes at 240° F. or 145 minutes at 245° F. or 135 minutes at 250° F. (Note by editor:—There are other bacteria more resistant to heat than B. botulinus, which may occur in corn and which require a more severe process for their destruction.) If the initial temperature is as low as 160° F. an additional time of about 40 minutes is required. The corn should be held in the cooker at 190° F. or more to make sure of 180° F. initial temperaure, and no delay in processing should be permitted under any circumstances. To avoid damage to the color of the corn, the following processes which are equivalent to each other in sterilizing effect are suggested for corn in No. 10 cans:—(1) Blow steam through retort two hours without pressure, then raise temperature to 240° F. and cook two hours longer. The use of a preliminary process at 212° F. is unsatisfactory from the standpoint of sterilization. (2) Cook two hours at 240° F., blow off steam to retort temperature of 222° F. and continue process 70 minutes at this temperature; (3) Cook two hours at 245° F., blow off steam to a retort temperature of

226° F. and continue the process for 40 minutes at that temperature; (4) Cook 105 minutes at 245° F., blow off steam to 222° F. and continue the process for 75 minutes at that temperature. These processes are based on an initial temperature of 180° F. and are given as the minimum processes for safety against B. botulinus. Spoilage, due to other bacteria present, will result unless cans are sufficiently cooled before being placed in storage.

B. S. CLARK

551. The mechanical penetration of the sweet corn pericarp. R. A. RUDNICK AND A. L. BAKKE. *Proc. Iowa Acad. Sci.* 27, 129-32, (1920); through *Botan. Abstracts* 12, 477(1923).—By suspending the pans of a scale on a pully it was possible to measure greater pressures than could be used with a Joly balance. Pericarp of corn in the canning stage, dented, and mature were used, both dry and after 8-72 hours soaking in water. There is a marked increase in the pressure required to penetrate the pericarp as the grain matures. Soaking does not materially reduce the pressure necessary to cause penetration.

C. W. CULPEPPER

552. X-Raying tinplate for corn black. W. E. ELWELL. *Canner*, Mar. 3, p. 162 (1923), (Convention Number); *Canning Age*, Feb., p. 12(1923); *Trade*, Feb. 12, pp. 61-62(1923), (Convention Number).—A review of the work done to eliminate black in canned corn. The author suggests the use of the X-ray to determine the physical differences in tinplate samples. He also suggests study of the steel used in making plate.

B. S. CLARK

553. Complaints on kraut. *Canner*, Jan. 20, p. 56(1923).—Extracts from letters written by consumers of kraut expressing dissatisfaction for some cause or other are given, and suggestions by the National Kraut Packers Association for eliminating such complaints in the future are made.

J. E. MCCONKIE

554. Canned spinach as a source of botulism. RUTH B. EDMONSTON, CHARLES THOM AND L. T. GILTNER. *Am. Food J.* 18, No. 1, 33-6(1923); through *C. A.* 17, 1287(1923).—Results of an investigation on 401 cans of spinach of a particular pack responsible for the outbreak of botulism at Kendallville, Indiana, are given. Methods theoretically and generally practically adequate had been followed in the cannery. Cans found free from spoilage by inspection, appearance of unopened can, vacuum present, and the odor and appearance of the spinach were free from evidence of bacterial activity as determined by culture. Swells were found to carry active bacterial contamination or to be pronounced examples of chemical corrosion. Experimental inoculation with resealing and incubation of 64 cans was made. Toxin sufficient to kill guinea pigs was formed in 3 before gas or odor or both developed sufficiently to make possible their removal by inspection. Among large numbers of cans handled under widely different storage conditions, the occurrence of an occasional can in which the toxicity has reached the danger point before gas or swell is detectable is clearly a possibility with spinach. Careful inspection before opening and actual recooking of the product as it comes from the can should be followed. Incubation under observation at the factory is recommended together with the use of batch numbers or storage of unit lots to insure the detection and separation of undercooked lots from any cause. These lots should be reprocessed after removal of swells.

H. A. LEPPER

555. Italy forging to front as tomato canning country. ALFRED P. DENNIS. *Canner*, Jan. 20, p. 37(1913).—A general discussion of the progress which Italy is making in this field and reasons why the Italian product is superior to the American in some respects. Also a description of the various classes of tomato products with which the Italians have been especially successful and statistics showing why Italy may well be feared in the future as a worthy competitor in supplying the canned tomato market of the world.

J. E. McConkie

556. Cost of canning nineteen twenty-three tomatoes. William Silver. *Canner*, Feb. 10, p. 37(1923).—Detailed tabulation of costs gives for No. 2 standards, .8969 dollars per dozen with tomatoes at $15.00 per ton, and for profit.
J. E. McConkie

557. Canned combination vegetable salad. *Canner*, Jan. 20, p. 30(1923).— A canned vegetable salad consisting of ripe olives, pimentos, asparagus tips, No. 3 standards, 1.288 dollars per dozen. These estimates do not include string beans, and peas, is being packed by a California packer.

J. E. McConkie

MARINE PRODUCTS

(*See also number 526*)

558. The function of vacuum in canned salmon. E. D. Clark, R. W. Clough and O. E. Shostrom. *Pacific Fisherman* 21, No. 5, p. 8; No. 6, p. 12; No. 7, p. 13(1923).—Cans of salmon having bulged ends are not merchantable although some of them may be edible. The ends are held in a concave position by the presence of a partial vacuum within the can produced by an exhaust process either by mechanical means (pumps) or by heat. An additional vacuum may be produced by the disappearance of oxygen from the gases in the headspace. In addition to keeping the ends of the cans properly collapsed, a partial vacuum has the further advantages of reducing the strain on the can during retorting and in restricting the growth of certain bacteria which may survive the retorting process. Several factors influence the amount of vacuum obtained; time and temperature of exhaust; fill of can or headspace; loose or tight seams; exhaust with cans open or with lightly clinched covers. Each of these influences is discussed and charts, based on theory and experiment, are given showing the relation of the amount of headspace to the vacuum obtained during the exhausting process. Storage and shipping conditions influence the amount of vacuum in the can. Shipping to a warmer climate or a higher altitude decreases the vacuum. Numerous shipments of salmon have been the subject of controversy between buyer and seller on account of "springers" or "swells" due to insufficient vacuum. Frequently on return to shipper these cans would become normal once more. Tables and charts are given showing the effect of temperature and altitude on vacuum. The article has been reprinted in bulletin form. Ray W. Clough

559. Changes in oil used in frying sardines. H. R. Beard. *Calif. Fish and Game Comm. Circ. No. 1*, 8 pp.; through *C. A.* 17, 599(1923).—Conclusions: (1) The use of corn oil and a hydrogenated oil (Crisco), in addition to cottonseed oil, is feasible. (2) The presence of varying quantities of fish oil, and the action of air and heat are largely responsible for the changes which take place in fry-bath oil. (3) Sardine oil is present to a greater or less extent in fry-bath oil used for frying cardines. When fat sardines are fried its increase is so rapid that it is not long before the fish are being fried in an oil which is largely sardine oil. To keep the sardine oil content of the fry-bath low, the sardines should be fried in the minimum quantity of oil. This

covers all cases except where the oil content of the bath is increasing as it does when very fat sardines are fried. Then the oil should be allowed to increase, as far as conditions will permit, as long as a condition exists. (4) Attempts to reclaim used fry-bath oil by chemical treatment have been unsuccessful. It is not probable that a cheap, successful method will be developed.
RUTH BUCHANAN

560. Hovden's method of canning California sardines. *Canner*, Jan. 20, p. 31 (1923).—The Hovden process eliminates the cooking in oil and is claimed to give a product far superior to any put up in the regular oil cooking bath. The fish are cleaned, washed in salt water, and dried in a continuous drier. They are then cooked in ovens, cooled two hours and packed immediately. Where the oil bath is used, fresh oil should be used each day. J. E. MCCONKIE

561. Shrimp and oyster industries of Biloxi. ANTHONY V. RAGUSIN. *Fishing Gazette*, 40, No. 5, 17 (1923).—Biloxi on the Gulf Coast, State of Mississippi, is the headquarters of the shrimp canning industry. There are 20 shrimp and oyster canneries there producing $3,000,000 worth of products annually.
C. R. FELLERS

562. Overcoming waste in the fishing industry. JOHN N. COBB. *Pacific Fisherman* 21, No. 4, p. 12; No. 5, p. 15 (1923).—Immense waste occurs in fishing industry amounting to thousands of tons of material each year which in the meat packing industry would be saved. However the fish packing plants are so widely scattered that it is difficult to handle most of this profitably. This waste consists of spoiled whole fish, heads, tails, entrails, eggs and melt of dressed fish. More careful removal of the head and tail would result in saving a considerable percentage of the edible portion increasing the pack by thousands of cases. The immature fish eggs can be utilized as food as a substitute for sturgeon eggs in the making of caviar. A method for making caviar is given. The sperm or melt is also edible. Cod sounds and tongues may be salted as is done on the Atlantic Coast. Fish cheeks and split heads form very acceptable articles of diet. The 96,600 tons of waste material discarded along the north Pacific Coast in 1921, if rendered, would have produced scrap worth about $1,750,000 and over 11,000,000 gallons of oil worth about $3,500,000. The best quality of scrap is suitable for cattle food and the rest for fertilizer. A meal very high in protein has been made from the lamprey eel. Fertilizer can be made from seaweed and the shells of various mollusks and crustaceans. Liver oils may be obtained from the cod, greyfish, shark, pollock, etc., and fish oils from the flesh of the herring, salmon, etc. Glue is made from the skins of the cod and related species. Leather from the skins of aquatic animals is made to a small extent. Whale and porpoise meat has been sold both fresh and canned and the amount could be increased.
RAY W. CLOUGH

563. Germicide in ice to allay decay. W. E. GIBBS. *Canadian Fisherman* 10, No. 4, 99 (1923).—Experiments made on fishing boats in England show that "Salunol" (sodium hypochlorite) when frozen in the ice used for chilling fish has a marked germicidal and preservative action on the fish. One part of "Salunol" added to 400 parts of water before freezing gave an ice that was most effective in prolonging the palatable condition of the fish packed in it. One-half gallon of "Salunol" per ton of ice costs 1s. 6d. (Abstractor's note:—It is possible that the use of sodium hypochlorite solutions might prove highly beneficial in keeping the holds of purse seine fishing boats in good condition and thus remove one of the main sources of infection for the salmon before canning. In this connection see *Fishing Gazette*, 40, No. 7, 17(1923), abstract No. 564, this journal). E. D. CLARK

564. Disinfection and deodorization of fishing vessels and plants. M. M. STONE. *Fishing Gazette* 40, No. 7, 17(1923).—Decomposing bilge water contains much organic matter and possesses a very offensive odor. The hydrogen sulfide gas also blackens lead paint. The destruction of these odors was investigated. Hypochlorite of soda made by the electrolytic decomposition of salt brine was used in the preliminary tests on the destruction of the odors arising from foul bilge water. The tests performed consisted in adding to definite volumes of bilge water varying volumes of hypochlorite of soda at full strength, and allowing the solution to act over varying periods of time. It was found when an equal volume of hypochlorite of soda and bilge water were mixed, there resulted a slight fishy odor. An increase in the quantity of the germicide added brought about complete deodorization. It was also further noted that the hypochlorite of soda when added in proper volume to cause complete deodorization also effected a solvent action on the suspended solids of the bilge water thus leaving the solution in a fairly clear state. It is expected that further tests to be performed on board a vessel during this next month will prove of great interest to the fishing industry in maintaining fishing vessels, piers, markets and utensils in a clean sanitary condition. The results of the experiments performed thus far justifies the statement that the elimination of disagreeable odors emanating from the bilge water is possible and practicable and that further tolerance of these odors is unnecessary.
C. R. FELLERS

565. A new brine freezing system. *Pacific Fisherman* 21, No. 7, p. 42 (1923).—Describes a method for freezing fish. A picture of the machine is shown on page 39.

566. American fisheries prominent at Brazilian exposition. *Fishing Gazette*, 40, No. 5, 30(1923).—The U. S. Bureau of Fisheries exhibit at the Brazilian Centennial Exposition at Rio de Janeiro includes a limited representation of the fishing industries, fishing colleges of the U. S. and activities of the Bureau by pictures, charts, models, instruments and products. The materials selected give the visitor information regarding the location, importance, methods and products of each important fishery industry in America.
C. R. FELLERS

567. Brine freezing. C. L. ANDERSON. *Fishing Gazette* 40, No. 6, 23 (1923).—This concise and comprehensive article describes the advantages claimed for the brine-freezer and the methods in vogue in Europe. None of the three methods are entirely practical and none have been entirely perfected, though they show good promise. C. R. FELLERS

568. Southern Fisheries Association Convention. *Fishing Gazette* 40, No. 8, 21(1923).—A report of proceedings of the Convention.

569. The occurrence of copper and zinc in certain marine animals. HAZEL W. SEVERY. *J. Biol. Chem.* 55, 79-92(1923); through *C. A.* 17, 1282(1923).—The copper and zinc contents of the following marine animals of the Pacific coast were investigated; sea anemone, black, yellow and red starfish, sea urchin, yellow slug, California oyster, clams, mussels, abalone, cryptochiton, shrimp, crab, salmon, sea-lion, and whale. Copper was present in all except the clam and whale, the average amount being 0.497 milligrams per kilogram. Zinc was present in all the animals, the average amount being 4.25 milligrams per kilogram. The distribution of copper and zinc in the cryptochiton was not uniform, the blood containing the greatest amount of copper and the least amount of zinc. The copper which is in combination with protein unites with oxygen to form oxyhemocyanin. The mantle carried the largest amount of zinc but an amount of copper lower than that in the blood. The zinc content of the California oyster was the highest of all the samples analyzed but was much lower than that of the eastern oyster. The sea-lion and whale, being mammals, do not carry copper to any extent and the copper in the sea-food eaten does not seem to be accumulative. Zinc, however was present in the muscle, spleen, liver, blood and bile but in amounts less than that found in the oyster. Copper is present in the lower forms of sea animals as an oxygen carrier in place of the iron of mammals but environment does not seem to change the sea-lion and whale in this respect. The function of the zinc is not clearly known but it may be present as an aid to enzymic action in a manner not understood. A. P. LOTHROP

MILK AND MILK PRODUCTS

570. Effect of autoclaving on the vitamin content in milk. E. J. SLANETZ. *J. Dairy Sci.* 6, 237-242(1923).—When pressures of 10 or 15 pounds are maintained for 15 minutes, the fat soluble A vitamin and the water soluble B vitamin of milk are not affected. Growth curves are given. J. H. BUCHANAN

571. The destruction of antiscorbutic vitamin in milk by the catalytic action of minute amounts of copper. A. F. HESS AND L. J. UNGER. *Proc. Soc. Exptl. Biol. Med.* 19, 119(1921); through *C. A.* 17, 126(1923).—Diluted dried milk heated to 60° for 40 minutes in a copper vessel was found to contain 1.4 parts of copper per million. Guinea pigs fed on this milk in addition to oats all developed scurvy and died after about 4 weeks. Controls given the above diet plus 2 cubic centimeters, daily, of orange juice grew normally. Controls given similar portions of milk heated in a glass vessel and oats did not become scorbutic during a period of 4 months. The minute trace of copper may act as a catalyzer causing destruction of antiscorbutic vitamin. This factor should be considered in commercial pasteurization or condensation of milk.

572. Government standards for condensed, evaporated or concentrated milk. *Canner,* Jan. 27, p. 33(1923).—Condensed milk, evaporated milk, concentrated milk, is the product resulting from the evaporation of a considerable portion of the water from milk, or from milk with adjustment, if necessary, of the ration of fat to non-fat solids by the addition or by the abstraction of cream. It contains, all tolerances being allowed for, not less than 7.8% of milk fat, nor less than 25.5% of total milk solids; provided, however, that the sum of the percentages of milk fat and total milk solids be not less than 33.7%. (Note:—"Condensed" as used in this definition refers to unsweetened condensed milk known commercially as evaporated milk.) J. E. McCONKIE

573. The grading of milk. J. E. PURVIS. *J. Roy. San. Inst.* 44, 37-44(1923).—An address. Shows that pollution in milk arises from factors outside of the animal. If the cow is not diseased safe milk is produced which may become unsafe on account of improper methods of handling. In order to have safe milk, diseased animals must be eliminated and better methods of handling must be introduced. F. W. TANNER

MISCELLANEOUS PRODUCTS

(See also numbers 532, 590 and 600)

574. **Clarification of vinegar.** *Canner*, Mar. 31, p. 46(1923).—A specially prepared diatomaceous earth of high purity, sold under the name of "Filter Cel," seems to impart a permanent luster to vinegar and similar products when used as a clarifying agent. J. E. McConkie

575. **Beware of gas developing in fermenting tanks.** F. T. Palmer. *Am. Vinegar Ind.* May 2, 18(1923).—Carbon dioxide, apt to be present in cider tanks in great volumes, has practically the same effect on the human system as has ether. A tank should be tested for gas by lowering a lighted lantern into it. If the lantern goes out the tank should be sprayed with water. It is dangerous to use open lights in tanks coated with certain classes of paint. Ernest H. Wiegand

576. **The legal chemistry of some vinegar containing products.** R. O. Brooks. *Am. Vinegar Ind.* June 2, 3-6(1923).—Most tomato catsup is made with "grain" vinegar. A good catsup is characterized by fairly high citric acid content (0.5 % to 0.8%) and slight lactic acid content. The only fair basis of judgment in analyzing catsup is to calculate the data to a dry, sugar-free, salt-free basis and then make comparisons. Molds are formed under various conditions and the product should be carefully examined before being destroyed. E. H. Wiegand

577. **Manufacture of vinegar from pure culture of acetic acid bacteria.** Ludwig Eberlein. *Am. Vinegar Ind.* June 2, 9-10(1923).—Detailed accounts of experiments inoculating different bacteria in various forms of vinegar are given. Filters of beechwood shaving and excelsior were used. As a result the vinegar was clear, and rich in flavor and aroma. The methods used are still in need of correction and improvement. E. H. Wiegand

578. **Improvements, in, and relating to, apparatus for vinegar making (Cont.)** *Am. Vinegar Ind.* May 2, 14-16(1923).—The invention relates to improvements in vinegar-making apparatus, and particularly to improvements in vinegar-making apparatus of the Schutzenbach type. Some of the objects of the invention are to provide: (1) Means for cooling the mix and the air, supplied to the generator, below a pre-determined maximum temperature. (2) Mechanism for throwing such cooling means into and out of operation. (3) Means for maintaining interior of generator independent of temperature of external atmosphere. (4) Generator with acid-proof lining. (5) Walls of the generator with openings for admission of air to compartments and means for controlling the flow of the air. E. H. Wiegand

579. **Improvements in, and relating to, apparatus for vinegar making.—Part two.** *Am. Vinegar Ind.* June 2, 11-13(1923).—Detailed figures and explanation of the apparatus are given. The temperature of the mix in the storage tanks is carefully controlled by means of a thermo-regulator. Arrangements are made for a constant supply of fresh air which is necessary in vinegar making. E. H. Wiegand

580. **Character of water suitable for vinegar making.** *Am. Vinegar Ind.* May 2, 1923).—The water must be clear, colorless, and odorless, and should contain no nitrogen compounds, such as nitrous acid and ammonia, which

would indicate the presence of products of decomposition and of organic substances. Large quantities of phosphates and chlorides make water unsuitable. Water containing iron should be excluded. Water rich in carbonates is unfavorable because of neutralizing action upon the acetic acid. A hard water with a moderate content of carbonate and phosphate of lime and magnesium is advantageous for vinegar manufacture since these mineral salts in small amounts promote the development of the vinegar bacteria.

E. H. WIEGAND

581. **Recent progress in the chemistry of syrups and molasses.** F. W. ZERBAN. *Ind. Eng. Chem.* 15, No. 1, 7-9(1923).—Discusses new sources of syrups, new methods of preparation or purification, nature and composition of syrups and molasses, analyses and utilization. P. L. GOWEN

582. **New publication discusses soy and related fermentations.** *Am. Grocer,* June 20, p. 15(1923).—Dept. Bull. 1152 of the U. S. Dept. of Agr. gives a discussion of the results of investigations in the preparation of soy sauce and related fermentation progresses and the process of manufacture.

A. H. CARLE

FOOD ANALYSIS AND NUTRITION

(*See also numbers 539, 547, 569, 570 and 571*)

583. **Report on the determination of pectin in fruit and fruit products.** H. J. WICHMANN. *J. Assoc. Official Agr. Chem.* 6, 34-40(1922); through *C. A.* 17, 1288(1923).—Collaborative results are reported on the analysis of a strawberry jam containing added pectin for alcohol precipitate (4 methods), pectic acid, ash, sulphur in ash, total sulphur and water insoluble solids (2 methods). The methods including preparation of sample are given. The tentative Association method for alcohol precipitate gives high results and it is recommended that it be dropped. Results on sulphur in ash indicate that some sulphur is lost in ashing. This is the simplest method of determining sulphur but not the most accurate. H. A. LEPPER.

584. **Presence of cobalt and of nickel in plants.** GABRIEL BERTRAND AND M. MOKRAGNATZ. *Compt. rend.* 175, 458-60(1922); through *C. A.* 17, 124 (1923).—The analytical methods have been improved so that not only cobalt and nickel but zinc and copper can be determined in 0.02 grams of soil. Analyses of the ash of 20 samples of mostly food vegetables showed that every sample contained nickel and all but oat and carrot contained cobalt. One kilogram of material was used for the determination of cobalt and nickel in the case of seeds, 2 kilograms in the case of leaves or stalks. The proportion of cobalt in plants ranges between less than 0.02 milligrams and 0.3 milligrams per kilogram of fresh material. The corresponding range for nickel was 0.01 in tomato to 2.0 in peas. As little as 0.005 milligrams of cobalt will show crystals of cobaltonitrite. Even in the carrot the color reaction of cobalt with dimethylglyoxime and ammonium sulphide was obtained.

L. W. RIGGS

BACTERIOLOGY

(*See also number 554*)

585. Epidemic of typhoid fever caused by the consumption of sweet cider. P. PAQUE. *Rev. d'Hyg.* 45, 165-169(1923).—About 24 cases of typhoid fever were caused by the drinking of sweet cider polluted with fecal matter from the water used in washing the apples before expressing the juice. Discussion by several hygienists following the paper indicates that sweet cider may be an agent for dissemination of intestinal diseases. One person mentioned the dissemination of intestinal infections by a beer with a low alcoholic content. Sweet cider with a low alcoholic content may be a possible means of spreading objectionable bacteria and should be subjected to the same rigorous methods of handling to which other foods are subjected. F. W. TANNER

586. Investigations on the contamination of sweet cider and its relation to the spread of typhoid infections. P. PAQUE. *Rev. d'Hyg.* 45, 749-757(1923).—Paque continued the work reviewed in the previous abstract to determine the longevity of certain members of the typhoid group in cider. Bacterium typhosum and Bacterium paratyphosum A were found to be destroyed after a week in cider. Bacterium paratyphosum B, however, showed a greater resistance. It was able to withstand a cider with 2.5% acetic acid for 8 days. Paque believes that a cider 15 days old would be safe. The water used in washing the apples should be clean, or if known to be unclean, made clean by some of the approved methods such as the addition of hypochlorites, permanganate, etc. If there are objections to these procedures, the manufacturer may resort to an active yeast in pure culture with which to "start" the fermentation. Paque showed by data that the typhoid bacilli could not long endure exposure to the products of an active fermentation. These two papers indicate again that a pure water is necessary in the food industry.

F. W. TANNER

587. An unusual growth of mold. FREDA M. BACHMANN. *Abstracts Bact.* 7, 16, (1923).—A report on the discovery of a mold in canned grape juice. The solid bulk of mold was at least 14 inches long and was probably the result of several years growth. Oxygen requirements were satisfied through a slightly imperfect seal. E. J. CAMERON

588. Die Bedeutung der paratyphuserkrankungen der schlachttiere fur die fleischbeschau. (The importance of paratyphoid infection of butcher stock in meat inspection.) M. MULLER. *Tijdschr. v. Diergeneesk., Utrecht.* 49, 777-785 (1922); through *Abstracts Bact.* 7, 194-195(1923).—The author speaks of the paratyphoid problem, by which he understands the fluctuations in the virulence of the paratyphoid bacteria with reference to a single species on the one hand, and on the other hand, the fluctuations in the pathogenicity of individual paratyphoid strains for man and animals with regard to their bipathogenicity. As paratyphoid diseases of animals he understands those caused by *Bacterium paratyphosum* B, the Gaertner bacillus and the Voldagsen bacillus. The question of the importance of those diseases is confused by a series of circumstances. In this connection the author mentions the fact that meats may become infected post mortem, the fact that disease in man is apparently more frequent from the post portem infection of meat and finally the fact that ante mortem infection of the meat has been found to be harmless for man. It is stated that the paratyphoid diseases of man, which are designated as meat poisoning, have nothing to do with the purulent-ichorous blood poisoning of butcher animals. Meat poisoning as paratyphoid infection in so far as the meat came from ante mortem infected animals is to be attributed to specific infections of paratyphoid, while the purulent-ichorous diseases are to be attributed to non-specific wound infection, sapremia of the animals. In the recognition of these facts the author sees the foundation for an understanding of the whole paratyphoid question in regard to meat inspection. The author points out that paratyphoid bacteria occur in animals much more frequently than does meat poisoning in man. This, the author attributes to the practice of cooking or frying, although this does not entirely explain the phenomenon. The relation of paratyphoid to meat poisoning is further discussed and the difficulties regarding the same pointed out. The author states that paratyphoid infections in butcher stock which lead to emergency slaughter and in which the bacilli are numerous in the blood and the muscles must be suspected to be pathogenic to man and that paratyphoid infections which are latent or localized have from a meat inspection standpoint a subordinate importance as experience has shown them to be of reduced virulence.

589. Ueber ausgedehnte Wurstvergiftungen, bedingt durch Bacillus proteus vulgarus. (Extensive sausage poisoning due to Proteus vulgaris.) KARL BAERTHELEIN. *München Med. Wchnschr.* 69, 155-156(1922); through *Abstracts Bact.* 7, 194(1923).—A report is made of an epidemic of over 2000 cases within two days during June, 1918, among front line soldiers along the Verdun front. The symptoms were entirely gastro-intestinal with no suggestion of botulinus poisoning. The sausage was recently made under veterinary control. Investigation disclosed that regurgitation of intestinal contents by cattle during slaughter introduced *Proteus vulgaris* in the head parts which were made into sausage. Subsequent washing did not entirely remove them. Boiling of the sausage for 20 minutes also failed to sterilize. The extraordinary hot and humid weather at the time permitted a rapid multiplication of the bacteria during the brief time (3 to 5 days) from manufacture to the consumption in the trenches. Bacteriological examinations of stools, stomach contents, and of the sausages yielded pure cultures of *Proteus vulgaris,* and not a trace of *Bacterium paratyphosium B* or *Bacterium Enteritidis gaertner.*

590. Bacterial food poisoning from mutton. A. W. YOUNG AND C. D. DAWSON. *Lancet,* Lond., No. 5168, 608(1922); through *Abstracts Bact.* 7, 194 (1923).—The authors report an outbreak of food poisoning in which 25 individuals were attacked. Clinical diagnosis of bacillary food poisoning was confirmed by the isolation, from a fatal case, of a bacillus of the Gaertner group, B. *suipestifer* (or *aertrycke*) type mutton.

591. Le microbe de la gomme du sucre (The bacterium of sugar-gum.) H. VIOLLE. *Ann. de l'inst. Pasteur, par.,* 36, 439-454(1922); *Abstracts Bact.* 7, 68 (1923).—A non-pathogenic, gram-positive, coccus resembling the lactic streptococcus, was isolated from sucrose-containing foods (dates, figs, etc.). The action of this organism on sucrose results in the production of a viscous substance. It is grown best aerobically on a bean-sucrose-gelatin at 37°C. It is important as a spoilage organism in sucrose-containing foods.

E. J. CAMERON

592. Intensive localized distribution of the spores of B. botulinus and probable relation of preserved vegetables to type demonstrated. J. C. GEIGER AND HARRIET BENSON. *Pub. Health Rep., Wash.* 38, 1611-1615(1923).—Experiments carried out indicate that both types A and B, B. botulinus may be present in soil, though certain vegetables contaminated with such soil may favor the development of one type at the expense of the other.

I. A. BENGSTON

593. Differentiation and identification of the sporulating anaerobes. I. C. HALL. *J. Infect. Dis.*, Chicago, 30, 445-504(1922); through *Abstracts Bact.* 7, 53(1923).—This paper undertakes a taxonomic organization of the anaerobic bacteria. It is based on a study of 73 pure strains, all but 4 of which belong to 15 species. A new species, *B. centrosporogenes*, is described. A differential key for the sporulating anaerobes is presented.

594. Studies on halophylic micro-organisms. The flora of meat curing solutions. WILLIAM S. STURGES. *Abstracts Bact.* 7, 11(1923).

595. Classification of anaerobes producing toxins poisonous by mouth. IDA A. BENGTSON. *Abstracts Bact.* 7, 17(1923).—A classification based on cultural reactions and toxins produced by single cell cultures of strains of types A, B and C of B. botulinus. Three strains of type A were studied, all of which showed strong proteolytic action. Three strains of type B were studied of which two showed strong proteolytic action and one non-proteolytic type C strains from fly larvae and "limberneck" chickens were non-proteolytic or feebly proteolytic.

E. J. CAMERON

596. Concerning the botulinus toxin. R. I. STEHLE. *Science* 56, 143-144 (1922); through *Abstracts Bact.* 7, 196(1923).—A discussion of recent work by Bronfenbrenner and Schlesinger with comment upon the minute quantities involved in producing death in mice. As only one or two molecules of toxin could be present life of the organism must depend on integrity of one or two cells or its action must be catalytic.

597. A spontaneous disease of chickens and ducks associated with a toxic anaerobe. ROBERT GRAHAM AND I. B. BOUGHTON. *Abstracts Bact.* 7, 29-30 (1923).—An account is given of two distinct cases of avian botulism. An anaerobic, spore-forming rod resembling B. botulinus was demonstrated in each case apparently possessing toxic properties. No protection was given, however, by botulinus antitoxin A and B. Fly larvae were found in the crop of one bird and a saline suspension of material from the crop caused death when fed to guinea pigs. Protection was provided by the use of antitoxin for the fly larvae anaerobe isolated by Bengtson.

E. J. CAMERON

598.. Botulism. C. BROQUE. *Rev. d'Hyg.* 45, 44-59(1923).—A general review based alsmot entirely on American work of more recent dates. No new data are released.

F. W. TANNER

LAWS, REGULATIONS AND STANDARDS

(See also numbers 534 and 572)

599. Canadian standards of canned corn. *Canner,* Jan. 27, p. 42(1923).—Definitions of the various grades of corn are listed as adopted by the Canadian government.

600. Pickle standards of the National Pickle Packers Association. *Canner,* Feb. 10, p. 39 (1923).—Fourteen definitions governing pickle standards as adopted by the National Pickle Packers Association are given in detail.

J. E. McConkie

601. Canadian government standards. Their object and how administered. C. G. McGillivray. *Trade,* Jan. 1, pp. 12-16(1923); *Canner,* Jan. 20, p. 39 (1923).—The Department of Health administers the Food and Drug Act, which deals with all food products from the standpoint of purity, wholesomeness and weight. The Department of Agriculture administers the Meat and Canned Foods Act. Strict sanitary regulations are very diligently enforced in all canneries. All raw materials must be sound and wholesome and remain so throughout the period of preparation. The labels must bear the name of the packer or of the first dealer obtaining it directly from the packer, and must contain a true description of the contents of the can. Check samples are taken of all goods exported and imported to see that they are correctly marked. Legally established grades, or standards of quality are "Fancy"' "Choice," "Standard" and "Second." Peas must be labeled according to size as well as according to quality. The sizes are 1, 2, 3 and 4. Fruits are labeled also for syrup. The legalized standards represent an attempt on the part of the government to establish public confidence in the goods.

C. O. Ball

GENERAL

602. Use of the microscope in the cannery. W. V. Cruess. *Canner,* Mar. 24, p. 27 (1923).—The microscope is of great value in controlling the quality of tomato products. Microscopical examination of these reveals the number of micro-organisms present, and these numbers as determined by the Howard method for examining tomato products are roughly proportional to the amount of rot or fermentation in the sample. In highly concentrated tomato products this proportionality fails. Examinaton of spoiled cans quickly reveals the type of organism causing the spoilage and enables their probable source to be traced.

J. E. McConkie

603. Disinfection in food products factories. Harper F. Zoller. *Pacific Bottler,* July, p. 28(1923).—The need for more perfect disinfection is paramount. Sodium hypochlorite is recommended as the most promising disinfectant available. The best range of temperature for the disinfecting rinse solution is 30 to 40°C.

E. H. Wiegand

604. Efficiency of some common anti-ferments. II. E. H. Harvey, *Am. J. Pharm.* **90**, 105-8(1923); cf. *C. A.* **17**, 1106; through *C. A.* **17**, 1675(1923).—The use of the oils of spices within the limits set by the taste is an aid in the preservation of such food products as catchup, tomato sauces, etc. Yeast is quite tolerant of salt solutions. Saccharin exerts a mild anti-fermentative action, the quantity permissible in use being regulated by the taste.

W. G. Gaessler

605. Points of interest respecting preserved food, more particularly that supplied to the fleet. T. J. Underhill. *J. State Med.* 30, 336-55(1922); through *C. A.* 17, 598(1923).—A history of the preservation of food is given. During recent years the action of different food products on tin has been overcome by treating tin plates with a specially prepared lacquer consisting mainly of shellac and sandarac and baking the treated sheets. No coating will stand sterilization at the high temperature used for meat products, broths, etc. No preservatives should be allowed. Contamination from other causes such as small drops of solder and foreign flavors such as from material used in lacquering the outside of tins or from rancid oils used in the manufacture of stamped tins is to be avoided. The processes of packing canned beef, mutton and boiled beef are discussed in detail. Ruth Buchanan

606. Penetration of heat in canned goods during sterilization. Bidault. *Bull. Soc. Hyg. Aliment.* 10, 471-86(1922); through *C. A.* 17, 1088(1923).—Experiments gave practically the same results as those of Bigelow, *et. al.* (C. A. 15, 127). These results can be used in commercial canning, so as to obtain reasonable certainty of efficient sterilization without unduly affecting the quality of the products.

607. British market for American canned goods reviewed. American Chamber of Commerce in London. *American Grocer*, June 13, pp. 6-8(1923).—The canned goods trade, and the canned meat section in particular, have been somewhat under a cloud since the poisoning tragedy last August at Loch Maree in Scotland, when 8 persons died from eating sandwiches made with meat paste. The British Government thoroughly investigated the case while research was conducted on canned foods with a view to ascertaining what dangers arise in the preservation of foodstuffs and the best methods of avoiding those dangers. The results of these investigations were given in an address by Sir William Willcox. A brief business report is given of the various canned products, evaporated milk enjoying increasing sales, the principal source of supply being the United States. A list is given of the new regulations regarding the composition and labeling of canned milk for sale in Great Britain. A. H. Carle

608. Report on canned foods. R. W. Balcom. *J. Assoc. Official Agr. Chem.* 6, 49-51(1922); through *C. A.* 17, 1283(1923).—Changes as given are recommended for official adoption in the wording of the Howard methods for the microanalysis of tomato pulp, puree, sauce and paste to secure greater accuracy and clearness. H. A. Lepper

664.805
AB

ABSTRACTS OF CANNING TECHNOLOGY

UNIVERSITY OF ILLINOIS
LIBRARY-CHEMISTRY

Editor: W. D. BIGELOW, *Director of Research Laboratory.*
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FACTORY CONSTRUCTION AND EQUIPMENT

(*See also number 716*)

609. **Purification of liquids by centrifugation.** A. F. MESTON. *Chem. Age* 31, 370-2(1923).—This is a description of the De Laval Separator by their research engineer.

610. **Chemistry in the control of plant enemies.** WALTER COLLINS O'KANE. *Ind. Eng. Chem.* 15, 929-931(1923).

611. **Pumps for industrial purposes.** W. F. TRAUDT. *Ind. Eng. Chem.* 15, 929-931(1923).

612. **Electrical motors for industrial purposes.** J. L. MCK. YARDLY. *Ind. Eng. Chem.* 15, 921-925(1923).

613. **Recirculation driers.** ERNEST H. WIEGAND. *Oregon Agr. Exp. Sta. Circ.* 40, 11(1923); *Botan. Abstracts* 12, 948(1923).

614. **Model processing plant at Dinuba, California.** FRANK R. BRANN. *Fruitman,* Mar., p. 5(1923).—The plant so intelligently described in this article is probably the most modern and best equipped of any fig cannery and processing plant in California or the world. It was built by the Peach and Fig Growers Association which has a membership of about 8000 growers. Dinuba is in the heart of a prolific fig producing district hence it is an excellent location for such a plant. It has a floor space of 52,000 square feet and cost $130,000. The capacity of the plant is 25 tons of canned and preserved figs per day and employs 150 people, principally women. "Fig Brownies" and "Fig Meat" are products of this plant as well as canned and preserved figs.

W. V. CRUESS

CONTAINERS

615. **Fiber boxes in clean food packing.** G. R. BROWDER. *Trade*, May 7, pp. 28-30(1923); *Canner*, May 19, p. 27(1923).—Fiber boxes are used extensively and are especially well adapted for use in shipping coffee, glass packed foods, dried fruits, candy and confectionery, butter and its substitutes, and foods canned in tin. The railways have adopted definite specifications for the construction, packing, and sealing of fiber cases. The chief advantages of the fiber case are (1) lower costs, (2) boxes are folded flat for shipping to user, and occupy small storage space, (3) boxes are easily set up and packed for sealing, and there is less cost in handling them with most other containers, (4) the weight is considerably less than that of other containers, (5) when boxes are sealed they cannot be pilfered without plainly showing evidence of same, (6) content of the box is better protected against shock because of the resilient character of the fiber material, (7) filled boxes are smaller in size for corresponding weight of other containers, and (8) the smooth sides may be printed for advertising. The development of the fiber box during the past 15 years is discussed. C. O. BALL

616. **The solubility of metal utensils in foods.** K. K. JARVINEN. *Z. Nahr. Genuss.* 45, 190-1(1923).—It was desired to obtain some information on the solubility of various metals used in the manufacture of cooking utensils in the food products cooked therein. For the sake of simplicity common foodstuffs were not used, but in their place a 5% salt solution and fruit juices containing known amounts of citric acid and sugar. Experiments showed that a currant juice did not behave markedly different from a water solution of sugar and acid of approximately equal concentration. The quantities of metals taken up from the containers were determined colorimetrically (Cf. *Z. Nahr. Genuss.* 45, 183-90 (1923). A 40% sugar solution containing 2% citric acid was more corrosive than one containing but 1%, although not proportionately so. The solubility was found to vary greatly with the amounts of oxides upon the surface of the metals. The averages of the results obtained were calculated to the amounts dissolved by 1 kg. of solution from 2½ sq. decimeters of the container in three hours. No temperatures are given. Water was added from time to time to replace that lost by evaporation. The following table is given:

	Fruit juice containing 40% sugar with 1.5% acid	5% salt solution
Iron vessel	1400 mg.	104 mg. iron
Untinned copper vessel	65 mg.	70 mg. copper
Tinned copper vessel	27 mg.	7 mg. tin
Nickel vessel	76 mg.	4 mg. nickel
Aluminum vessel	120 mg.	9 mg. aluminum
White brass vessel	.5 mg.	1.2 mg. copper
White brass vessel	2.1 mg.	2 mg. zinc
Enameled ware	6000 mg.	—salts

Salt solutions are less corrosive than the acid fruit juices. With the exception of untinned copper, metal vessels may be safely recommended for the preparation of salty foods. White brass appears to be the most suitable for the acid fruits. Contrary to general opinion the enameled ware is rapidly attacked by acid fruits. R. H. LUECK

617. Position of tin plate makers explained. *Iron Age*, 112, 603 and 649 (1923).—The position of the tin plate manufacturers with regard to the complaint of canners and grocers about the quality of tin plate was clearly set forth by Vice-President S. A. Davis of the American Sheet & Tin Plate Co. He discussed the various steps in the manufacture of tin plate with regard to materials and operations, pointing out the limitations of each, with other factors that enter. The questions as to tests were also discussed.

A. H. CARLE

618. Metallic poisons in food stuffs. W. M. WILLOUGHBY. *Lancet* 204, 255 (1923); *Analyst*, 48, 184(1923).—It is generally stated that the presence of tin in canned foods is due to the action of fruit or vegetable acids or meat extracts upon the tin coating of the containing vessels. The author points out that de-tinning is most probable with those foods to which sodium chloride is added. Even sanitary containers, the interior of which is lacquered, are not free from electrolytic action, owing to fracture of the lacquer or of the tin coating in the process of seaming the cover. The electrolysis is set up between the exposed metals and the salt solution and not only contaminates the contained food, but also leads to the development of pinholes through which air gains access to the interior of the cans. The wood shavings or paper case surrounding canned lobster serves only to prevent discoloration of the fish and has no effect upon metallic contamination.

F. J. DASHNER

619. Federal tinplate standards for packers cans. TINPLATE COMMITTEE, N. C. A. *Canner*, Aug. 4, p. 27(1923).—The brief submitted to the United States Bureau of Standards, pertaining to government standards and specifications for tinplate used in the manufacture of food containers is given verbatim. J. E. McCONKIE

620.Standards for tinplate for packers' cans. TINPLATE COMMITTEE of the National Canners' Association. *Canner*, Sept. 8, p. 27(1923).—A general summary is given of the alleged defects in tinplate now being used for packers' cans, and the resulting trouble to the packer. Criticisms of the present system of designating different grades of plate are given, and a new system to be based on Government specifications is suggested. J. E. McCONKIE

SANITATION, WASTE DISPOSAL AND WATER SUPPLY

(*See also number 718*)

621. Water filtration. *Canner*, Sept. 22, p. 36(1923).—Bulletin 105 on water filtration, published by the Permutit Company, thoroughly covers the theory and practice of modern filter design, construction and operation.

J. E. McCONKIE

622. Purifying industrial water. D. H. KILLIFER. *Ind. Eng. Chem.* 15, 915-917(1923).

623. The effect on canned foods of industrial waste in the water supply. E. F. KOHMAN, N. C. A. *Circ. No. 4-L*, 11 pp.(1923); through *C. A.* 17, 3062 (1923).—Such serious damage has been the lot of some canners during the last season that it has seemed advisable to specify what constitutes a wholesome water supply from their standpoint. These canners had used the same water supply for years, during which time there was no new source of pollution. Moreover, it was the city supply which was passed upon by public health authorities. The foods packed over a period of weeks later proved to be unmerchantable. K.

briefly discusses the following subjects (1) Requirements of drinking water. (2) Requirements of canning water. (3) Water contaminated by taste-producing organisms. Their presence disqualifies the water for canning. (4) Water contaminated by industrial waste. The case of a by-products coke plant is cited in detail. Mention is made of several similar cases. (5) Chlorination involved in producing foreign taste. (6) Only certain proportions of phenol and chlorine produce taste. Results of numerous experiments on this point are given. (7) Conditions which caused unmerchantable products. (8) Necessity for watching water supply. "Water which contains the effluent from a by-products coke plant in any dilution is not a suitable supply for canners. Chlorination of such a water may cause a taste which will make canned food unmerchantable. Even though such a water has been used for years with no noticeable effect, it is only a question of time when the right combination of conditions will result in disaster. A chlorinated city water supply is always a source of danger to canners. Chlorine has been found to produce a pronounced taste under conditions other than when the water was polluted by a by-products coke plant. Canners must be constantly on guard lest their water supply contains something which will give them an inferior quality in their product."

J. A. KENNEDY

624. Phenol contamination of public water supplies. *Eng. News-Record* 90, 928(1923); through *C. A.* 17, 3067(1923).—Contamination of water supplies by phenols from by-product coke ovens, gas and tar products works is increasing. Chlorination of waters containing phenols gives offensive tastes and in a case in Ohio chlorination was abandoned because of taste with loss of protection to health. Two preventive methods have been considered; the elimination of the wastes from public water supplies, and attempts to remove the phenols from these wastes. The latter has been successful at some plants by using the wastes in the coke-quenching pits. Objections to this method are odors around the coke plant and the discoloration of the coke. Legal action is doubtful as regards results until damage to health is proved.

FRANK BACHMANN

625. Water pollution by phenol and chlorine. A new reaction between phenol and chlorine. E. F. KOHMAN, *Ind. Eng. Chem.* 15, 518(1923); *J. Soc. Chem. Ind.* 42, 624A(1923); *Trade*, May 14, p. 25(1923).—Water which has been contaminated by the effluent from a coke oven plant and subsequently chlorinated was found to have seriously affected the flavor of canned vegetables and fruit, even when only used in boilers raising steam for heating water from another source, which was subsequently used in the canning process. Various chloro phenols prepared by the action of chlorine on phenol were tested and their flavors detected at no higher dilution than 1 part in 100 million. On chlorination of phenol at a dilution of 1 part in 750 million however, a much more pronounced taste was obtained than that of any of the chloro-phenols prepared at much lower dilutions, and the taste was of a different character. If phenol is chlorinated at concentrations greater than 1 part in 50 million, the resulting taste resembles that of the chloro-phenols. A little excess chlorine at higher dilutions completely destroys the taste. It is evident therefore that phenol and chlorine at dilutions greater than 1 part in 50 million react differently from the way they react at higher concentrations. This combination of chlorine and phenol has a very penetrating odor, and is volatile in steam.

D. V. ALBERTS

626. Hardness of large public water supplies in the United States. *Municipal* *and County Eng.* 64:4, 174(1923). Abstracted in *Am. J. Pub. Health,* 13, 697 (1923), by Abel Wolman.

627. **The sanitation of bottled beverages and soda fountain drinks.** JAMES P. KILCOURSE. *Am. J. Pub. Health,* 13, 550-556(1923).

FRUITS AND FRUIT PRODUCTS

(*See also numbers 614, 616, 625, 732, 736, 737, 738, 745, 747, and 769*)

628. **Baked apples in cans.** *Canner,* July 7, p. 38(1923).—A California packer is canning baked apples in cans, the friut being packed whole and one to a can.

629. **Canning solid pack apples in the Pacific Northwest.** E. H. WIEGAND. *Canner,* Aug. 18, p. 27(1923).—A diagrammatic sketch of an efficient method of handling a large tonnage and producing a uniform product is given. Brief descriptions are given of the usual factory practices in blanching, filling, exhausting, and processing. J. E. MCCONKIE

630. **Manufacture of apple butter stock.** C. H. CAMPBELL. *Canner,* Sept. 22, p. 39(1923).—Brief directions and precautions are given for the production of apple butter stock.

631. **Apple sirup manufacture.** *Am. Vinegar Ind.* Oct. p. 18(1923).—Raw cider, or apple juice, is treated with pure milk of lime until nearly all of natural malic acids are neutralized. The cider is then heated to boiling and filtered through a filter press. The resultant liquid is evaporated either in continous evaporators or open kettles, cooled and allowed to stand for short time. It is then refiltered through the filter press, which leaves a sirup with practically the same basic composition as cane sirup. Its flavor and appearance are distinctive, and it will keep indefinitely. ERNEST H. WIEGAND

632. **Vacuum condensed cider at 117°.** C. H. FEILBERG. *Am. Vinegar Ind.* 3, Sept., p. 10(1923).—Prohibition requires that cider be treated with benzoate of soda to stop fermentation. This gives the cider a bitter taste, however. Mr. Feilberg uses condensed cider at 117° F. in vacuum instead. This gives a permissible cider that retains its life and flavor, and when brought back to a beverage is equal to cider right off the press. No cold storage is needed for the vacuum condensed cider, the natural carbon dioxide forming during the process holds it until water is added. It has been successfully shipped in wooden containers a distance of 2,000 miles, where with water a beverage was made of unquestionable natural quality. ERNEST H. WIEGAND

(Note by editor—The keeping quality is no doubt due to the increased acidity and solids rather than to carbon dioxide).

633. **Clarification and filtration problems of cider and vinegar manufacturers with suggestions of their solutions.** PAUL HASSACK, *Am. Vinegar Ind.,* Oct. p. 9 (1923).—(Article cont. from Sept. issue). Pre-clarification of liquids does not cause a reduction of solids or cause changes in the chemical composition of cider and vinegar. Solids in suspension, but not solids in solution, are removed. The capacity of filters depends on: (1) the area of the filtering surface; (2) suitable filter medium or filtration aids; (3) the resistance, thickness and fitness of the filter mass; (4) the degree of turbidity, viscousness, specific gravity and solid contents of the liquid to be filtered; and (5) pressure under which the liquid is charged. There are only a few types of filters that will render good service to this industry, such as wooden frame filter presses or plates and frames made of acid resisting metals, special tin

alloy coated. Recently filter presses are also made of vitrified stoneware. With the use of a wooden filter press and addition of Filter-Cel, neither taste, color nor odor is imparted to the liquid filtered. Within fifteen minutes of operation the liquid discharged from every filter chamber will run brilliant. The filtration rate depends on the condition of the liquid.

ERNEST H. WIEGAND

634. The manufacture of wholesome cider. W. W. CHENOWETH. *Am. Fruit Grower,* Sept. p. 4(1923).—Three fundamental requirements in producing high quality cider are a good mill, the right kind of fruit, and cleanliness. A cider mill consists of two essential parts, the pulper and the press. Pulpers are of two types, the crusher and the grater, the latter being preferable. The hydraulic press is better than the screw press. A power mill, although it costs more than the hand mill, will soon pay for itself in the larger yield of cider. Good fruit should be used; no one can make palatable cider from rotten dirty fruit. Winter apples make a richer cider than autumn or summer apples. The higher the sugar content of the apple, the greater its value. Not only should the fruit be clean, but also the entire mill. Three methods of clarifying are: sedimentation, straining, and filters. The average farm manufacturer will find straining the simplest. ERNEST H. WIEGAND

635. Juice of citrus fruits and its more systematic commercial utilization. A. PIUTTI. *Boll. sci. tecn. periodico bimestrale per gli A i del comitato nazionale sci-tecn. per lo vih. ppo l'incremento dell' industria ital.* 3, No. 2, 72-3; *Bull. Agr. Intelligence* 12, 1193-4(1922); through *C. A.* 17, 2754(1923).—The best method of keeping the fresh juice in a condition suitable for export is to concentrate it under vacuum at temperatures not above 50 to 60° when an extract representing 1/8 to 1/10 of the original juice is produced. In the commercial preparation of the juice the old methods must be abandoned and the superficial colored external portion, containing the essential oil, removed alone and the juice extracted with a special apparatus consisting of rotating glass lemon squeezers. It is filtered through knitted cloth in a stone ware centrifugal filter and kept in stoneware vessels. E. SCHERUBEL

636. Figs as raw material for alcohol manufacture and as a stock feed. J. BENAVET. *Agriculture* 6, No. 3, 354-6(1922); through *C. A.* 17, 2462(1923).—One of the products used in the manufacture of alcohol is the fruit of the fig-tree, *Ficus carica.* The actual alcohol yield of ripe figs is almost equal to that of plums: 15 to 20 kg. of 90° alcohol or 30 to 33 liters of 54° alcohol is given by 100 kg. of dried figs. One hectare of fig trees produces 800 to 900 liters of 90° alcohol. The process of fermentation is described. *Nutritive value of figs before fermentation.*—According to the analyses made by Raventos (Barcelona), figs contain: protein 4.3, fat 0.3, sugars 71.2%: 3047 calories, whereas the analysis of wheat gives: protein 10.7, fat 2.1, sugars 74.7% and 3519 calories. These figures explain the value of this food for the rapid and effective fattening of pigs. *Nutritive value of figs after fermentation.*—Analysis gives moisture, at a temperature of 160°, 85.71, ash 1.08, protein substances 1.75, fats 0.27, crude fiber 3.37, N-free extracts 7.82%. These results show that figs after fermentation make a good stock feed; they are very suitable for fattening cattle, though should not be fed to dairy cows. H. GILMAN

637. Grapefruit canners organize. *Am. Grocer,* July 25, p. 10(1923).—Canners representing 95% or more of the output of canned grapefruit of Florida and Porto Rico met in Washington during the week of July 14th and organized both a Grapefruit Section of the National Canners Association and the National Grapefruit Canners Association. The same men were elected to the same offices in both organizations. Mr. C. E. Street of the Florida Grapefruit Canning Company, Bradentown, Fla., was elected Secretary. The newly formed section appointed a committee to consider the subject of inspection and standardization of the product. The canning of grapefruit began only two years ago but the sales demand is such that the pack is well over eight million cans. A. H. CARLE

638. Canned grapefruit. *Canner*, Apr. 28, p. 31(1923).—Canned grapefruit is fast increasing in popularity although its inception is of recent date. The fruit is treated with hot water to soften the peel, which is then removed by hand. The fruit is then cored by machine, and the segments disintegrated and filled in cans by hand. The open cans are run through hot water to exhaust, sealed and sterilized in hot water. J. E. MCCONKIE

639. Report on last season's grapefruit canning. C. E. STEWART. *Cal. Citrograph* 8, No. 11, Sept. p. 377(1923).—Last season's grapefruit canning operations resulted in the approximate production of 500,000 cases. Of this amount 250,000 cases are credited to Florida, 200,000 to Porto Rico and 50,000 to California.

640. Olive standards. *Canner*, Sept. 8, p. 38(1923).—In new methods of grading recently adopted, olives are graded according to the number per pound as follows: small, 135 per lb.; medium, 113 per lb.; large, 98 per lb.; extra large, 82 per lb.; mammoth, 70 per lb.; giant, 60 per lb.; jumbo, 50 per lb.; colossal, 40 per lb. J. E. MCCONKIE

641. Salad pears. *Canner*, Apr. 14, p. 35(1923).—Whole pears of uniform size with the stem left on, are being packed in sirup for making salads.

642. The canning of peaches in California. W. V. CRUESS. *Canner*, Sept. 22, p. 23; Sept. 29, p. 25(1923).—The article includes a complete description of the peach packing industry. The most suitable canning varieties of both cling and freestone types are described, and recommendations of the Nurserymen's Selection Association as to the quantity of each to be planted in order to prolong the season. All operations including picking, shipping, receiving, inspecing, cutting, pitting, trimming, peeling, blanching, sorting, grading, filling cans with fruit and sirup, exhausting, marking, sealing, sterilizing and cooling, are described in more or less detail and many best methods pointed out. The results of an extensive investigation on "cut out" tests by the National Canners Association are included, which indicate that present Government regulations as to drained weights are difficult to meet in commercial practice. Average figures on yield and waste per ton are given. J. E. MCCONKIE

643. Peach specifications in California. *Canner*, May 26, p. 32(1923).—Changes in specifications adopted by the California Peach Growers are as follows: minimum size of No. 1 peaches is increased to 2 3/8 inches, and the minimum size of No. 2 peaches to 2 1/8 inches. J. E. MCCONKIE

644. Advantages of canning prunes fresh. W. V. CRUESS and J. G. BROWN. *Canner*, Apr. 7, p. 27(1923).—Small experimental packs of fruit unsuitable for drying (80-90 to the pound after drying) were packed in light sirup and placed on sale on the University of California campus. The stock was almost immediately bought up and more demanded. The canned product has a fresh prune flavor, is of light pink color, and very attractive in appearance. By canning the small fruit fresh, the expense of drying, grading, sorting, seeding, and storing is avoided, all of which is useless if the fruit is to be canned later, and a more tasty product is obtained at the same time. J. E. McConkie

645. **Prune drying in the Pacific Northwest.** Ernest H. Wiegand. *Am. Fruit Grower*, Aug., p. 5(1923).—Types of driers used are the natural draft drier and the re-circulation drier; the latter proved very successful. Sanitation is necessary—the fruit should be kept after drying in dust-free storage bins. A more even dry is obtained by having fruit of uniform size. A 1 or 2% lye solution at the boiling point is the proper solution for dipping. The shaker system of traying is generally used with success. Three factors involved in drying are temperature, humidity and circulation. A temperature of 150-160° F., humidity 15-30% and a circulation of 750 lineal ft. per minute is recommended. Prunes should be dried down to moisture content of about 20%, and after removal from the drier, should be dumped on tables to cool. Processors of shaker type are used and can be made to suit any capacity.

Ernest H. Wiegand

646. **Some pointers on making strawberry preserves.** H. W. Pearson. *Canner*, July 21, p. 29(1923).—Care is necessary in selecting the variety of berry best for preserving, of which the Superior, Wolverton, Klondike, and Gandy are examples. The berries should be delivered to the factory, slightly green, in order that the finished product have a bright red color. The sirup added varies with the condition of the berries, as does the cooking temperature. After cooking, the preserves are drawn off into water-jacketed cooling pans from which they are filled directly into the jar with constant stirring to avoid separation of fruit and liquid. Comments are made upon the more important features in successfully packing preserves. J. E. McConkie

647. **Inventors working on preservation of fruit juices.** *Pacific Bottler* 43, 16 (1923).—Two new patents have been issued for the preservation of fruit juices. One patent comprises "agitating such a juice with hydrated aluminum silicate, removing the silicate and absorbed matters by centrifugal force applied in such a degree that the effluent remains hazy or cloudy, pasteurizing the effluent juice and bottling." The other process comprises "diluting such juices, adding a sugar, and fermenting the resulting product by means of a lactic acid ferment." Ernest H. Wiegand

648. **Fruit sirups and concentration of fruit juices.** E. Walther. *Am. Vinegar Ind.*, Oct., p. 14(1923).—It is necessary to have the right proportion between the sugar and acid. Thirteen parts of sugar are boiled with seven parts of juice; when the sugar is dissolved, the sirup should be filtered through flannel to remove the albumin. The product is then weighed, and loss of water made up by adding enough water to yield 20 parts of sirup. The time of boiling should be short. It is advisable to cool the sirup after boiling. The best method is to boil sirups in a vacuum. A great deal of flavor disappears if the boiling is too prolonged. Vats should be closed with a cover which acts as a condenser. The water is distilled off in order to gain the extracts. The method of filtration is as follows: collect ten gallons of aromatic rectified distillate separately, and 75 galons extract. Cool the latter and mix with an equal volume of alcohol. The liquid is then allowed to settle, the clear portion filtered off from the residue, introduced in the still, and the alcohol distilled off. Final extractive residue is mixed as before with concentrated flavor. The result is a clear concentrated juice fit for shipment.

Ernest H. Wiegand

649. Preserving fruit juices by carbonic gas. *Am. Vinegar Ind.*, Sept. p. 11 (1923).

650. The canning of fruit blends. W. V. CRUESS. *Canner*, July 21, p. 27 (1923).—Fruit blends, the canning of which was originated as an off season activity, have found such favor with the consumer that their packing is now encroaching on the regular fruit season. When the blend is to be packed during the slack season, the fruits are packed separately in No. 10 tins during the regular season and these tins are subsequently cut, the blend made, re-packed and re-sterilized. The formulae for blending the fruit vary, the following being typical for a No. 1 tall tin: four apricot halves, four maraschino cherries, four pieces of pineapple, four pear quarters, and quartered cling peaches to give the necessary weight. The exhaust time varies with the size of can, a four to six minute exhaust being the average. Process times range around 13 minutes for No. 1 tall and 15 minutes for No. 2½ cans. Experimental work is being done upon blends of chopped fruits which would be suitable for "starters" for salads and cocktails and which at the same time would afford an outlet for standard and second grades of fruits.

J. E. MCCONKIE

651. Carbonated beverages from pure fruit sirups. *Canner*, Sept. 15, p. 39 (1923).—A summary of the work done at the University of California by Cruess and Irish is given. Pure fruit sirups of several kinds were made up, diluted with carbonated water, bottled and pasteurized at 150° F. for 30 minutes. This length of pasteurization does not kill all spore bearing bacteria, but it kills all yeast cells which are the only organisms present capable of developing in the carbonated juice. The results of other pasteurization processes are given.

J. E. MCCONKIE

652. How to make real fruit drinks. W. V. CRUESS. *Am. Fruit Grower*, Sept. p. 4(1923).—The method to be followed in preparing a fruit sirup for bottling purposes varies according to the fruit. Sirups are most easily prepared from berries. Crush and heat the berries to about 140° F., press immediately, and filter the juice. Add slightly less than 1 lb. of sugar to each pint of juice. Place sirup in bottles, seal, and pasteurize bottles and contents in water at 175° F. for 30 min. Sirups from citrus fruits: oranges and lemons are crushed whole without peeling and are pressed. Approximately 13 lbs. of sugar per gallon of juice should be added. Apple juice should not be sweetened with sugar. It should be concentrated by freezing the juice at 15° F. to a mixture of ice crystals and sirup. The same process is applied to grape juice with good success.

ERNEST H. WIEGAND

653. Relation of jelly manufacture to canning. W. V. CRUESS. *Canner*, July 14, p. 27(1923).—Jelly juices and marmalade in canned form should prove a promising line of development for canners. Brief discussions are included, on the constituents of jelly and the theory of jelly formation, on the suitability of various fruits for jelly making, on the nature of pectin, and on the general process of jelly making and causes for failure. Tested recipes for making berry jelly, apple jelly, and lemon orange marmalade are given.

J. E. MCCONKIE

654. Application of the principles of jelly making to Hawaiian fruits. J. C. RIPPERTON. *Hawaii Sta. Bul.* 47, (1923); *Exp. Sta. Rec.* 49 No. 5 p. 410(1923).—Studies were made of the juices of guavas collected from three guava producing areas representing widely different conditions of climate, altitude and season. Results showed that location had a marked effect on acidity. The proportion of acidity in the juices of guavas from the windward side was less than 1%, whereas those from the leeward side averaged 1.5%. The pectin content was highest in fruits from the windward side and lowest in that from the mountain slopes, but in all cases was sufficiently high for jelly making. Seasonable variations were not outstanding, nor did different varieties of guava and different lots of the same variety show any marked variations. Tests made on guavas at different stages of maturity showed that while the quantity of juice increased with increasing maturity, the pectin quantity and acidity decreased. The total pectin extracted from the guava was increased by increasing the amount of water in which the fruit was cooked. It was possible to use as much water as fruit by weight without affecting the jellying property of the juice. Guava juices resemble other juices of high jellying power in that sugar, pectin, and acid can be varied within rather wide limits in jelly making. The maximum ratio for the common guava is 1.75 parts of sugar to one of juice, provided the acidity is 1% or more. The optimum acidity in guava jelly is between 0.6 and 0.75% of the jelly. The optimum pectin content is between 0.48 and 0.7 of the jelly. Other Hawaiian fruits which lend themselves to jelly making are the Isabella grape, roselle, and poha. Examination of the pectin found in the juices of these four fruits show that the consistency of a jelly is determined to a large extent by the physical properties of its pectin. The gelatinous short-fibered pectin found in the grape and roselle produce a weak, tender jelly, while a stronger textured jelly resulted from the guava and the poha in which the pectin is dense and long fibered. P. L. GOWEN

655. The relation of alcohol precipitate to jellying power of citrus pectin extracts. RUTH JOHNSTIN and MINNA C. DENTON. *Ind. Eng. Chem.* 15, 778-780(1923).—The amount of alcohol precipitate is not a reliable measure of effective pectin as shown by comparisons of pectin solutions prepared in the open kettle and in an autoclave. Determinations based on the jellying power give the only satisfactory means of estimating effective pectin content at present known to us. Citrus pectin extracts prepared in an autoclave at 5 pounds pressure for 30 minutes had 25% less jellying power than similar extracts prepared in the open kettle. The addition of acid in open kettle extraction of orange peel produced an extract of about 100% greater jellying power than when no acid was used. It was observed that in extracts prepared with acid, increase in alcohol precipitate was accompanied by increasing jellying power although not in exactly the same proportion. The fact that the acid extracts have 100% greater jellying power whereas the alcohol precipitate shows an increase of only about 75% over the distilled water extracts, seems to indicate that in the presence of acid not only is a larger quantity of pectin produced but likewise a more effective pectin as regards jellying power. P. J. DONK

656. Effect of dialysis on direct crystallization of citric acid from lemon juice. H. D. POORE. *Ind. Eng. Chem.* 15, 775-778(1923).—In the commercial production of citric acid from lemons the acid is precipitated from the clarified juice with calcium carbonate and the calcium citrate formed is decomposed with sulfuric acid. The average quantity of total acid present in a ton of lemons is 70 pounds. About 60 pounds of this is obtained from the juice and maceration water. The final yield of crystallized acid varies from

40 to 50 pounds, showing a loss of about 15 pounds per ton of fruit. It was thought that impurities in the juice might be collodial and that purification might be obtained through dialysis. Preliminary experiments using collodion sacs in dialyzing lemon juice, followed by dialysis on a large scale in an osmogene containing collodion impregnated cloth membranes gave the following results:

1. The small quantity of colloids present in lemon juice does not affect crystallization, but the ash and other nonacid constituents prevent satisfactory crystallization of concentrated fermented juice.

2. In the presence of ash and other impurities, needle and leaflet modifications of citric acid crystals are obtained, upon removal of half the ash characteristic citric acid crystals are formed.

3. At the concentration necessary for crystallization the mother liquor is so viscous that crystals cannot be separated. P. J. DONK

657. Is the hot water exhaust coming back? W. J. PIERCE. *Canner*, June 16, p. 35(1923).—The author states that a low temperature long steam exhaust gives much better results with fruits than the high temperature short exhaust. The long hot water exhaust gives exceptional results in elimination of the gas. At the same time the color is retained and no undue softening of the fruit takes place. B. S. CLARK

658. Vacuum dehydration. J. H. BUCHANAN and P. A. ZOOK. *Chem. Met. Eng.* 29, No. 25, 1097(1923).—The composition of fresh apples and pears was determined and that of the same fruits dehydrated under a vacuum of 28 in., a temperature of 70° C. and a time of 4 hours. Under these conditions a product was obtained good in appearance with moisture content reduced from 83 to 86% to 2.5 to 5.5%. Aside from this loss of water, the characteristic change in composition of the fruits examined was the inversion of a portion of sucrose to invert sugar. The small loss in ester content during dehydration indicates little breaking in cell structure, which is conducive to preservation of the flavor. R. J. THOMPSON

659. Oxygen and perforations in canned foods. EDWARD F. KOHMAN. *Trade*, May 21, pp. 10-12(1923); *Ind. Eng. Chem.* 15, 527(1923); *J. Soc. Chem. Ind.* 42, 622a(1923).—Three experiments to determine the effect upon perforations of varying amounts of oxygen in the can were conducted with apples. About 30 cans were used in each experiment. The cans in the first experiment contained practically no oxygen at the time of closure; those of experiment 2 contained more than the normal amount of gas, 80% of which was oxygen; and those of experiment 3 were like those of experiment 2, except that in the former, no exhaust was given, while in experiment 2 the cans were exhausted. After 10 weeks in the incubator at about 35° C., the cans of experiment 1 showed no perforations, those of experiment 2 showed 50% perforations, and those of experiment 3 showed 69.7 perforations. Apples canned in a normal manner in both plain and enameled cans, showed much more rapid disappearace of oxygen in the plain cans than in the enameled cans. This indicates that the disappearance is due to the action of the oxygen on the tin plate rather than to its combination with the apples and is offered as a tentative explanation for the fact that enameled cans perforate more rapidly than plain cans. It is stated that oxygen obeys the law of mass action in causing perforations rather than acting as a catalytic agent.

, C. O. BALL

VEGETABLES

(See also numbers 625, 737, 744, 768, 769 and 774)

660. Processing of corn and pumpkin. W. D. BIGELOW. *N. C. A. Circ. No. 8; Canner,* Sept. 1, p. 31 (1923).—Corn and pumpkin are alike in that their heat penetration is slow, as a result of which, the size of can exerts a profound influence on the length of time necessary for sterilization. In general the processes given No. 1 and No. 2 cans of these products are more efficient than those given No. 10 cans of the same product. With products of slow heat penetration, the initial temperature has a far greater influence on the time necessary for sterilization than with products which heat to the center of the can rapidly like peas or string beans. Hence corn and pumpkin should be filled hot and processed immediately. A light cook in corn tends to give a better color, but necessitates greater care in cooling and storing. Minimum processes for corn are as follows:

	Process time at retort temperature of		
Can Number	240° *Minutes*	245° *Minutes*	250° *Minutes*
1	65	55	50
2	90	80	70
5	150	130	120
10	180	160	145

Corn given this cook must be cooled below 100° F. and not stored in hot warehouses for any length of time, to prevent spoilage by thermophiles. Canners whose corn does not darken materially upon longer cooking, will incur less danger of spoilage by somewhat increasing the minimum process given above. Corn is not completely sterilized in any practicable process. The spores of a very few thermophiles remain alive in some cans. When corn is stacked in the warehouse in solid blocks before it is cooled below the average temperature of 100° F., these bacteria are likely to grow and cause spoilage. The following processes for No. 10 corn are equivalent to the processes tabulated above and give a better color to the product. Process No. 1. Blow steam through retort for two hours and twenty minutes without pressure. Heat retort to 240° and hold for two hours at that temperature. The total time of process is four hours and twenty minutes. Process No. 2. Cook two hours at 240°, blow off to 222° and hold at that temperature for ninety minutes. The total time of process is three and one-half hours. Process No. 3. Cook two hours at 245°, blow off to 226° and hold at that temperature for forty-five minutes. The total time of process is two hours and forty-five minutes. Process No. 4. Cook one hundred and five minutes at 245°, blow off to 222°, and hold at that temperature for ninety-five minutes. The total time of process is two hundred minutes. The heat penetration of pumpkin and squash is so slow that an exhaust has little value in heating the contents of the can, but the product should be filled into the can at not below 140° and processed immediately. A higher process temperature than 240° is not advisable for large cans, because of the undue strain on the can. The following processes based on an initial temperature of 140° are approximately equivalent.

Can Number	*Process time at retort temperature of* 235° Minutes	240° Minutes	250° Minutes
1	70	60	45
2	85	70	55
2½	105	90	70
3	115	95	75
5	145	125	105
10	195	170	140

The same precautions as to cooling are applicable to pumpkin as well as to corn, although in less degree, for the most resistant thermophilic bacteria will not grow in pumpkin. J. E. McConkie

661. Process in canned foods. *Canner*, Aug. 25, p. 27(1923).—A discussion of heat penetration and of the efficiency of processes in the sterilization of corn is given in correspondence written by W. D. Bigelow.

J. E. McConkie

662. Flat sours in canned corn. W. D. Bigelow. *Canner*, Aug. 18, p. 31 (1923).—Bacteria may be roughly classified in three groups according to the temperature at which they grow: mesophiles, which grow at medium temperatures and constitute the great majority of bacteria; psycrophiles, which grow at low temperature; and thermophiles, which grow at 110° F. or higher. In general, the higher the temperature at which these organisms grow, the higher the temperature necessary to kill them in the same period of time. The greater majority of swells and flat sours in corn are due to the activity of thermophiles which have been provided with suitable temperature for growth by insufficient cooling of the product. J. E. McConkie

663. Forecasting date and duration of best canning stage for sweet corn. Chas. O. Appleman. *Canner*, Sept. 1, p. 23(1923); *Bull. 254 Univ. of Md. Agr. Exp. Sta.*, May(1923).—After green sweet corn has reached the prime canning conditions it deteriorates very rapidly, especially in warm weather. It is, of course, necessary to get the corn into the cans with great dispatch, but it is of even greater importance that the corn be in the best canning stage when it is pulled. The corn may be doctored with sugar and starch, but the natural flavor and succulence cannot be replaced after it is once lost. The data presented are intended to aid the canner in predicting the approximate date when a crop of sweet corn will be in the best canning stage and also the number of days it may be expected to remain in that condition. These predictions are based upon experimental proof that for a certain period after the "pre-milk" stage, the rate of sweet corn ripening is controlled by the temperature. The data particularly emphasize the great rapidity of the chemical changes in sweet corn as it ripens, especially when high temperatures prevail. For this reason sweet corn requires very much closer attention in warm than in cooler weather. In some sections, other things being equal, the average quality of the pack could be improved by extending the canning period a little later in the season so as to include the cool nights of late summer and early autumn. J. E. McConkie

664. System for promoting uniformity in a corn pack. Wm. H. Harrison. *Canner*, Apr. 21, p. 27(1923).—A complete system of grading and recording accurately any variations in quality of the pack from day to day is given.

The system is valuable not only in controlling the uniformity of the seasons pack, but also in making shipments of consignments sold by sample. It is equally applicable to small or large plants. J. E. McCONKIE

665. **Corn and its uses as food.** *U. S. Dept. Agr. Farmers Bul.* 1236 (1923); *Exp. Sta. Rec.* 49, No. 2, p. 158 (1923).—Topics discussed include ways in which corn is used for human food, the food value of corn and the various products made from it, the use of corn meal for the preparation of breads and other dishes, and the use of corn flour, hominy, breakfast foods, pop corn, and fresh, canned and dried green corn.

666. **The necessity of grading sweet corn.** W. E. ELWELL. *Trade*, May 7, pp. 10-12 (1923); *Canner*, Apr. 28, p. 33 (1923).—The necessity for grading corn should be eliminated by the practice of growing properly and harvesting properly and at the right time. The canner should watch carefully every step from the selection of seed to the warehousing of the finished product.

C. O. BALL

667. **Grading canned corn.** *Canner*, May 26, p. 34 (1923).—A short discussion is given of a proposed system of grading canned corn by means of varying scores for different qualities of the product such as maturity, consistency, flavor, freedom from silks, cobs, and husks, general appearance, color and cut. J. E. McCONKIE

668. **Scientific grading of corn.** L. V. BURTON. *Trade*, May 7, p. 16 (1923).—It was found that a kernel of corn becomes more dense as it matures, therefore, a specific gravity test, if a good one could be devised, would be a good test for maturity. The method of simply floating the kernel in a salt solution has the disadvantage that the specific gravity of the kernel itself changes because of the salt entering the kernel. The mastication test is not considered very satisfactory. A method devised for getting the consistency of corn is to get the viscosity of the cream after it has been drained through a sieve.

C. O. BALL

669. **Corn grading in Canada.** G. J. LANGE. *Trade*, May 7, pp. 18-20 (1923).—A resume of the requirements for the grades of fancy, choice, standard and seconds. C. O. BALL

670. **Minnesota's method of grading corn.** E. B. COSGROVE. *Trade*, May 7, pp. 12-14 (1923); *Canner*, Apr. 21, p. 39 (1923).—An ideal corn canning plant would be equipped to run two grades of corn continuously so that the grade B corn would not have to stand in storage while the grade A corn is being canned. To pack very fancy (grade A) corn, there should be eliminated all ears that are either too young or too old, all that have been over-trimmed, and all that bear kernels that are off-color. The present basis of grading canned corn in Minnesota allows: for proper cutting of kernels, 5%; for proper maturity, 40%; for proper consistency, 10%; for freedom from silk and husk, 10%; for color, 10%; and for flavor, 25%. There is a grading tendency to emphasize consistency a little more and flavor a little less than is here indicated. C. O. BALL

671. **Cucumber and cabbage statistics.** *Canner*, May 26, p. 42 (1923).—Government figures on the acreage, yield, total production and price paid by packers in 1922 for cucumbers for pickling, and cabbage for kraut are given.

J. E. McCONKIE

672. **Discoloration of peas by copper sulfide.** W. D. BIGELOW. *Canner*, June 16, p. 31 (1923); *Trade*, June 11, p. 24 (1923).—Black spots on canned peas

were shown to be caused by the presence of copper sulfide which is black. The peas were contaminated with copper while passing through a brine separator which was made of copper. Combination of this copper with hydrogen sulfide, given off by the peas during the process, caused the black copper sulfide discoloration to develop. B. S. CLARK

673. **Grading peas from the field.** HENRY M. WOLLUM. *Canner*, May 26, p. 27(1923).—The necessity of grading peas for quality is pointed out. A satisfactory system should accomplish a threefold purpose: first, to enable the canner to segregate peas of uniform quality for separate packing; second, to insure the canner a fair price basis for his pea purchases; third, to provide a just basis of compensation for the grower. J. E. MCCONKIE

674. **Grading fresh peas for canning.** G. J. LANGE. *Trade*, Apr. 30, pp. 27-28 (1923); *Canner*, Apr. 21, p. 37(1923).—The following sizes of openings in the sieves for grading peas are recommended: No. 1, 9/32 inch; No. 2, 10/32 inch; No. 3, 11/32 inch; further sizes according to present standards. Ungraded peas should be marked "ungraded." Specifications for quality grading are recommended in five grades as follows: fancy, extra standard, standard, sub-standard, and seconds or culls. C. O. BALL

675. **Canning pimientoes in Georgia.** *Canner*, July 7, p. 27(1923).—Climatic conditions in Georgia are excellent for the production of pimiento peppers, where one company packs more of them than any state. The peppers are graded into sizes 1, 2, and 3, by slot cylinders after which they pass to the coring machines which extract the core and seeds by suction. They then pass through a roaster, the interior of which is kept at white heat, and emerge with the outer tough skin charred and easy to remove, but with the meat firm and the flavor unimpaired. The parched peppers are washed, sorted, and packed by hand in 7, 15, 20, or 26 ounce cans and go through the usual canning processes of exhausting, closing, and processing. The processing may be done either in open kettles or continuous cookers.
J. E. MCCONKIE

676. **Sweet potato, II. Chemical composition and comparative analyses of tubers.** C. I. JURITZ. *J. Dept. Agr. Union S. Africa* 2, 340-52(1921); *Bull. Agr. Intelligence* 12, 843-7; *C. A.* 17, 2460(1923).

677. **Production of sirup from sweet potatoes.** *Canner*, July 28, p. 28 (1923).—Department Bulletin 1158 issued by the United States Department of Agriculture outlines plans for a proposed sweet potato sirup plant. Experimental yields of sirup have run as high as 1.55 gallons per 50 pound bushel of cull potatoes. J. E. MCCONKIE

678. **The peerless tomato.** HENRY SMITH WILLIAMS. *Trade*, June 18, p. 8 (1923).—Reprinted editorials from *The Baltimore American*, June 11, 1923.—The food value of the tomato is compared to that of other foods in general.

679. **Suggestions for better canned tomatoes.** LEES BALLINGER. *Canner*, Sept. 1, p. 27(1923).—An excellent quality of tomato may be packed at only a slightly increased cost over inferior qualities, and the entire industry benefits. The importance of inspection as the fruit comes into the factory and after it is peeled is brought out. Tomatoes should be packed on the same day they are picked, or quality suffers. A proper exhaust and cook is essential if the product is to be firm and at the same time keep well. For a uniform red color in the can it is necessary that care be exercised in selecting the variety of seed used. J. E. MCCONKIE

680. **Tomato products, pulp, ketchup and chili sauce.** W. D. Bigelow and A. E. Stevenson, *Research Laboratory, National Canners Asso.*, Bulletin 21-L (73 pp.).—This consists mainly of material which has been published at various times on this subject from the laboratory of the National Canners Association and which is now brought together in one bulletin. It also contains a small amount of new material. Under pulp the following subjects are discussed: sanitary control of tomato pulp factories, quality of product, discarding tomato juice, composition of tomato pulp (whole and trimming stock) and methods of analysis which include microscopic examination, determination of total solids, of insoluble solids, of sugars, of acidity, of salt and of specific gravity. Extensive tables are given in connection with the composition of pulp which show among other things the relation of the specific gravity of the whole pulp, of the specific gravity of the filtrate from the pulp and the immersion refractometer reading of the filtrate to the percentage of solids in the pulp. Formulae are worked out for the calculation of the per cent of solids in the pulp by use of the refractive index (both by the immersion and Abbe refractometers) of the filtrate. The importance of the control of the specific gravity of the finished pulp in its relation to the yield from a given volume of cyclone juice is discussed. Methods of controlling the specific gravity during manufacture are given together with tables showing the volumes to which it is necessary to evaporate a given volume of cyclone juice of known specific gravity in order to obtain pulps of specific gravities 1.030, 1.035, 1.040 and 1.050. Tables are also given showing the relation of the Brix reading of the filtrate from tomato pulp to the per cent of solids and specific gravity of the pulp. Methods for the manufacture of ketchup are discussed. The manner and time of adding the various ingredients are treated. A table is given illustrating the method of calculating the quantities of the various ingredients to be added to a given volume of pulp of known specific gravity to obtain ketchup of uniform consistency and composition. Methods of controlling the manufacture either by concentrating to a calculated volume or by use of a refractometer are given. Methods for the manufacture of chili sauce are given. The original should be consulted for more definite information.

A. E. Stevenson

681. **Pointers for tomato paste packers.** C. H. Campbell. *Canner*, Sept. 22, p. 25 (1923).—Several precautions are given for producing good tomato paste among which are, good raw material and thorough washing, neutralization of excess acid with bi-cabonate of soda, and concentration in vacuum pans.

J. E. McConkie

682. **Processing of string beans and beets.** W. D. Bigelow. *N. C. A. Circ. No. 7-L; Canner*, Aug. 18, p. 29 (1923).—Beets are exhausted in all sizes of cans, while it is usually not customary to exhaust string beans except in larger sized cans, where it is necessary to do so to avoid excessive strain on the cans. Both products are processed under pressure and the larger sized containers should be cooled under pressure to eliminate buckling. Minimum processes necessary to insure sterilization, are as follows:

PROCESSES FOR STRING BEANS

	Process time in minutes with retort temperature of		
	230°	236°	240°
No. 2 cans	50	25	20
No. 3 cans	55	30	25
No. 10 cans	60	35	30
No. 2 glass	60	35	30

PROCESSES FOR BEETS

	Process time in minutes with retort temperature of	
	230°	240°
No. 2 cans	50	25
No. 3 cans	50	25
No. 10 cans	60	35
No. 2 glass	55	30

All of the above processes are based on a coming up time of five minutes. An excessively heavy cook for beets is injurious to the color, and rapid and thorough cooling necessary if a good color is to be obtained.

J. E. MCCONKIE

683. The effect of hard water in canning vegetables. W. D. BIGELOW and A. E. STEVENSON. *National Canners Association, Washington, D. C. Bull.* No. 20-L, 39 pp. (1923).—This bulletin presents data obtained both in the laboratory and in the canning plant on the effect of hard water in the canning of vegetables. Water softened by the zeolite method and waters of various degrees of hardness were used and a comparison was made of the tenderness of the vegetables packed using these different waters. The results are summarized as follows: *Water.*—Calcium and magnesium may be removed by appropriate softening methods; the zeolite method is best suited for softening water for canned foods. *Salt.*—A salt should be used which contains less than 0.3% calcium. In order to minimize as much as possible the hardening effect of calcium and magnesium the brine should be made as weak as is possible without material sacrifice of flavor. *Peas.*—The hardness of water used in the preliminary washing of peas for canning, and in rinsing the peas by means of a spray after the blanch, has no appreciable effect on the hardness of the canned product. Blanching peas in a wire basket or perforated pail suspended in a tank of hard water has a pronounced hardening effect on the canned product. In blanching peas in the continuous blancher usually employed by commercial canners, the peas first passing through the blancher remove the greater part of the calcium and magnesium compounds from the blanch water and thus soften it. These peas are therefore hardened to a greater extent than the peas that are blanched subsequently. When very hard water is employed, and the flow of water through the blancher is considerable, the hardening effect on the peas is proportional in a measure to the flow of water through the blanchers. The use of softened water for blanching is advantageous when the hardness of the water supply exceeds 200 parts per million. The softening of hard water for brining peas is of fundamental value. The hardness of the water and the amount of calcium in the salt used in brine for canned peas have a pronounced influence on the hardness of the product. The processes now used with peas are necessary for their sterilization. The use of softened water and pure salt in brining peas will therefore not pemit the shortening of the processes now employed. *Ripe beans.*—The hardening effect of calcium and magnesium compounds on dry beans is even greater than on peas. In packing ripe beans, therefore, it may be advantageous to soften water that is only slightly hard. The hardness imparted to ripe beans by the calcium and magnesium compounds of hard water or salt may be partly corrected by a long process, but the appearance of a product so treated is sometimes less satisfactory than that of beans treated with soft water and relatively pure salt and given merely the process necessary for sterilization. *String beans.*—Calcium and magnesium compounds in hard water and salt do not appear to exert a hardening influence on string beans; the softening of water for use with this product does not therefore appear to be of value. *Corn.*—Calcium and magnesium of hard water and salt do not exert a hardening influence on either cream style or whole grain canned corn. The use of softened water in the brine of cream style canned corn appears to produce a somewhat darker product than the unsoftened water. Its use is therefore disadvantageous. *Beets.*—Calcium and magnesium in hard water and salt combine with soluble oxalates naturally occurring in beets and sometimes produce a white coating on the surface of the beets. The softening of hard water and the use of relatively pure salt are, therefore, advantageous. Calcium and magnesium in hard water and salt do not exert a hardening influence on canned beets, at least below a hardness of 350 parts per million. A study has not been made with water of still greater hardness or with salt containing a relatively high per cent of calcium and magnesium.

A. E. Stevenson

MARINE PRODUCTS

(*See also numbers 756 and 769*)

684. **Cod-roe—an excellent food (Torskerogn-Et Utmaerket Naeringsmiddel).** *Tidsskrift for Hermetik-industri* 9, No. 5, 76(1923).—A brief account is given of the food value and vitamin content of canned cod-roe, together with an appeal for its wider use by the general public.

685. **Retaining the color in canned lobsters.** *Canner*, May 5, p. 34(1923).—The addition of not more than 1/5 of 1% of citric or acetic acid to canned lobster is found to largely prevent discoloration of the product.

J. E. McConkie

686. **France to admit lobster in acid pickle.** *Canadian Fisherman* 10, No. 8, p. 205(1923).—For a time it was feared that the French Government would place restrictions on the importation from Canada of canned lobster which had been packed in acid pickle to prevent blackening in accordance with the recent requirements of the Canadian Board of Fisheries. As France is the second largest customer in the world for canned lobster—Great Britain being the first—there was considerable anxiety regarding this situation. Some conferences were held between the French and Canadian authorities in which the Canadians pointed out that since Canada did not prohibit the importation of peas and other canned goods from France adulterated with copper sulfate to give a green appearance, it was no more than fair that

France should not prohibit the importation of canned lobster which had been treated with a slight amount of harmless acid in order to preserve its appearance. Finally the French customs authorities ruled that there would be no objection to the use of small quantities of acetic or citric acid in preparing canned lobster. E. D. CLARK

687. Standardization of lobster canneries. A. P. KNIGHT. *Canadian Fisherman* 10, No. 7, p. 187(1923).—Beginning with the 1924 packing season all lobster canneries in Canada will be required by the Dominion Department of Fisheries to attain a rating of at least 75 marks before they will be given a license to operate. For the 1925 season a cannery must receive 85 marks before it can receive a license, and in 1926 and thereafter a rating of 100 marks must be received. Each cannery is to be marked on a standard grading sheet. This sheet will contain specifications which the Department has adopted for the various procedures in catching, handling, cooking and canning lobsters, showing the marks allowed and deducted for the good and bad points in each procedure. Dr. Knight points out the four most important essentials in lobster canning: (1) washing the meat in running water; (2) source of the water supply; (3) the steam boiler; (4) drainage. From the standpoint of standardization he rates the five essential points as follows: (1) the factory; (2) the equipment; (3) sanitation; (4) sterilization; (5) the operations performed by the employees. It is believed that the specifications on the grading sheet for standardizing lobster canneries will result in a better pack. Many of the units enumerated can be manufactured by the fishermen themselves in their spare time, etc.

E. D. CLARK

688. The discoloration, smut or blackening of canned lobster. F. C. HARRISON and E. G. HOOD. *Transactions of the Royal Society of Canada*, 17, Section 5, 145-189(1923).—Discoloration, smut or blackening is of two kinds, chemical and bacterial, when applied to the appearance of spoiled canned lobster and of the container, as recognized by the following changes from the normal: (1) inky black discoloration of the meat; (2) inky black discoloration of the can interior; (3) blueing of the meat; (4) brown incrustation of the can interior; (5) brown discoloration of the paper; (6) black discoloration of the paper; (7) dull yellowish-white appearance of the meat; (8) varied other than blackening or browning—due to bacterial decomposition, manifested in many ways, as general decomposition resulting in a greenish and yellowish discoloration of parts of the lobster meat and alteration of the pickle, producing turbidity without the production of color. This paper deals with the relation of bacteria to discolored lobster, tin plate experiments to determine the effect of the can contents on four different grades of plate and other experimental packs relating to delay in packing, insufficient washing of the arm meat, etc. A summary of the experiments is given with definite results as to the causes and prevention of dicoloration. Some of these results are given in the abstract No. 186, *Abstracts of Canning Technology*, 1, 1923. J. R. ESTY

689. Coding of salmon packs. *Canner*, May 19, p. 33(1923).—Coding systems should show the cannery, grade, date of packing, and preferably the interval during the day on which the can was packed, according to recommendations from the Association of Pacific Fisheries.

J. E. MCCONKIE

690. Examination of canned salmon. E. D. CLARK, R. W. CLOUGH, C. R. FELLERS and O. E. SHOSTROM. *Pacific Fisherman*, 21, No. 9, p. 8; No. 10, p. 8 (1923).—Millions of cases of salmon are canned each year and distributed throughout the world either by the packers direct or through brokers. More and more frequently buyers are insisting upon a written report covering an examination of the parcel in question either by some trade examiner or by some laboratory. Uniform methods of examination and grading systems have been established for many food products but this has not been done for salmon although recognized as desirable. This article describes in detail the method now used by the National Canners' Laboratory at Seattle. Tables giving the size and names of the several species of salmon and a rather complete description of the appearance in the can are given; also tables showing composition and food value and the results of the laboratory examination of several thousand cans obtained by the method described. The cans of salmon are examined and reported upon under three general heads: workmanship in packing, quality of the fish when caught and condition of the fish when canned. A cut of the report sheet employed is given. The article has been reprinted in bulletin form. RAY W. CLOUGH

691. California tuna fish statistics. *Canner*, June 30, p. 29 (1923).—Statistics are given for the entire tuna packs of the years 1918 to 1922 inclusive.

692. Report Southern Fisheries Assoc. Convention. *Fishing Gazette* 40, Aug., 21-23 (1923).—The organization shows growth and enterprise. The meeting was held at Jacksonville, Fla.

693. A sword fisherman's log. CHARLES R. PATTERSON. *Fishing Gazette* 40, Aug., 17-19 (1923).—A popularly written article well illustrated with excellent photographs depicting this interesting industry.

694. U. S. Fisheries Assoc. Convention. *Fishing Gazette* 40, Sept., 19-22 (1923).—A complete report of the Fifth Annual Convention of the U. S. Fisheries Assoc.

695. Marketing and selling fish. F. W. WALLACE. *Fishing Gazette* 40, Sept., 22-23 (1923).—The main arguments used in advertising to secure greater consumption of fish are: 1. Eat fish for it is cheaper than meat. 2. Eat fish because it is tasty and palatable. 3. Eat fish because it will develop the fishing industry and help our fishermen. 4. Eat fish because it is a healthful food. C. R. FELLERS

696. Transportation report. F. D. FAUT. *Fishing Gazette* 40, Sept., 28 (1923).—A discussion of freight and express rates and other transportation problems confronting the fishing industry.

697. Fresh and frozen fish products and distribution. C. J. WEBER. *Fishing Gazette* 40, Sept., 30 and 43 (1923).

698. Brine frozen superior to air frozen fish. I. C. FRANKLIN. *Canadian Fisherman* 10, No. 7, p. 184 (1923).—Author gives a condensed summary of the advantages of the brine freezing of fish over air freezing, pointing out that the loss of weight in freezing is not appreciable, also that the rapid freezing of the cell contents does not rupture the cell walls, thus permitting the fish to assume a normal appearance and consistency upon thawing.

E. D. CLARK

699. Will Malagash solve salt problem? F. C. HARRISON. *Canadian Fisherman* 10, No. 9, p. 240 (1923).—This article is an abstract of Dr. Harrison's work on the use of various types of salts to prevent the reddening of salt fish. It is believed that the bacterium which causes the discoloration of codfish, herring and mackerel is found in the solar salt used by fishermen but is not found in Liverpool and Malagash salt. There is a large deposit of good salt at Malagash which can be rather cheaply mined and thus bring this cheap salt within reach of the ordinary fish curer. The chemical analysis of the Malagash salt compares very well with the Diamond Flake and Leslie Velvet salt recommended by the U. S. Bureau of Fisheries for fish curing. Author points out the great importance to the fish curing industry of using the proper type of salt in their operations if the reddening of the product and consequent serious loss is to be prevented. E. D. CLARK

700. **Vacuum drying of fish. (Vakuumtorring av Fisk).** JOH. TEIGSTAD. *Norsk Fisheritidende* 41, 6. 198-201(1922).—Description of a new machine for the drying of codfih (Klipfisk). The principle involved is that of drying in a partial vacuum at a temperature of about 22° C. The trial runs have been very satisfactory giving an A-1 product.

701. **Description of the salf codfish industry of Southern Norway. (Beskrivelse av Revfisket og Sorlandsklipfisken).** M. BARCLAY. *Norsk Fiskeritidende*, 42, 9, 217-231(1923).—A very good description is given of the extent of the fishery, the types of boats and gear, and the method of butchering, salting and drying the "klipfisk." Although the codfish industry of Southern Norway is very small as compared with that of the Northern part, the quality of the product is recognized as the best in Norway. This is attributed to the greater care used throughout the process and to the fact that the fish are brine-salted instead of dry-salted as is the common practice in Northern Norway.

702. **Future of oil production in fish canneries.** C. V. ZOUL. *Canner*, June 30, p. 27(1923).—Two permanent sources are vailable for the production of fish oils; the edible fish industry and the fish scrap fertilizer industry. The amount of oil from the first source is limited by the amount of fish packed but the quantity available from the second is limited only by the size of the catch. Fish oil can be made as edible as any of the vegetable oils now in common use. Present indications point to the following facts: the fish oil production of the country will grow. The oils produced with the cleanest and best processes will obtain the highest prices. Such oils will be in greater demand as the demand for edible products increases. Makers whose policy it is to produce only high grade oils will be first to reap the great benefits of the developing market. Consuming manufacturers will develop their processes to convert fish oils into "lard-like" compounds. The entire industry will organize and then standardize fish oils so that the market will know an oil by its grade name. J. E. MCCONKIE

703. **Future of oil production in fish canneries.** C. V. ZOUL. *Canner*, Sept. 29, p. 23(1923).—Arguments are advanced for the production of a better and more uniform grade of sardine oil, to satisfy the growing demand for good qualities of the same in the paint and allied industries. Suggestion for improving the quality by filtration to remove the gurry and bleaching to improve the color are given. Stearine, which must be removed before the oil can be used as a paint vehicle, can be readily removed by chilling the oil and filtering. J. E. MCCONKIE

MILK AND MILK PRODUCTS

(See also numbers 739 and 740)

704. Filled milk. *Am. J. Pub. Health* 13, 310-312(1923).—The existence of a deficiency of vitamin A in filled milk does not seem to form material for a strong argument against the manufacture of this product. From a health standpoint there is little to be said against filled milk. C. O. BALL

705. Canned milk production. *Canner,* Sept. 29, p. 28(1923).—Statistics compiled by the National Canners Association. showing production of both condensed and evaporated milk for 1911 to 1922 inclusive, are given.
J. E. MCCONKIE

706. A study of the factors that influence the coagulation of milk in the alcohol test. H. H. SOMMER and T. H. BINNY. *J. Dairy Sci.* 6, 176-97(1923); through *C. A.* 17, 2754(1923).—Solutions of various milk salts, 0.25 Molar were added to milk in varying amounts and the effect on the alcohol test is shown. Calcium acetate (0.2 cc) and 0.1 cc magnesium chloride when added to 25 cc. of fresh milk cause a positive test. As high as 0.9 cc. KCl, K_2HPO_4 and Na citrate failed to give a positive test. The effect of calcium and magnesium is counteracted by the citrates and phosphates. By feeding experiments with 3 cows it is shown the addition of $CaCO_3$ in amounts ranging from 50 to 200 grams daily to the ration caused the milk to become more and more positive. Increasing amounts of K_2HPO_4 were required to counteract it. No appreciable increase in total amount of CaO in the milk was shown by analysis. Acidity affects the alcohol test and the effect of acidity and salts is additive, 0.007% CaO being equivalent to an increase of 0.06% and 0.0088% P_2O_5 equivalent to a decrease of 0.04% in acidity. The effect of milk salts easily accounts for any lack of correlation between the alcohol test, acidity and bacterial counts. (Cf. *C. A.* 9, 2555; 15, 2516). Rennet produced changes in milk which caused a positive test, the amount of rennet and time of action being determining factors. Rennet-forming organisms are considered a minor factor. A discussion as to the effectiveness and justice of the application of the test is given. O. L. EVENSON

707. Studies on the "Electropure" process for treating milk. F. W. ROBISON. *Ind. Eng. Chem.* 15, 514-518(1923); *J. Soc. Chem. Ind.* 42, 621A(1923).—The "Electropure" process consists of passing the milk upwards between carbon electrodes embedded in opposite walls of hard rubber composition material which is in turn fixed in a rectangular upright metallic box. The milk, on reaching the space between the electrodes, rises rapidly in temperature until the desired temperature is reached, when it automatically flows out through a sensitive thermo-regulator to the cooler. The process has no greater effect on the cream line than has commecial pasteurization, when a temperature of 165° F. is not exceeded. There is an almost entire absence of any cooked taste in the treated milk. The total bacteria content of the milk is reduced over 99% by this treatment. The cooling of the electrodes and the fact that the heat is generated by the electrical resistance in the milk itself insures the absence of over-heating and the consequent preservation of the flavor of the milk. D. V. ALBERTS

708. Copper in dairy products and its solution in milk under various conditions. F. E. RICE and J. MISCALL. *J. Dairy Science* 6, No. 4, 261-275(1923).—

The presence of air and oxygen increases to a very great extent the amount of copper dissolved by milk. Copper corroded with an oxide surface yields more of the metal to milk than smooth bright copper. At a temperature of 145° F., more copper is dissolved than at room temperature or at boiling. This would be of importance in the manufacture of condensed or evaporated milk. Sugar up to 18% does not increase more than a very little bit the dissolved copper in milk. J. H. BUCHANAN

709. **Rapid method for counting bacteria in milk especially suitable for control in industry.** E. POZZI-ESCOT. *Ann. Chim. Analyt.* 5, 130-132 (1923); *J. Soc. Chem. Ind.* 42, 675A (1923).—A dilute solution of blood is prepared by mixing one drop with 500 cc. of isotonic serum. One drop of this solution is carefully mixed on a microscope slide with a drop of milk and the mixture dried. The slide is immersed in a bath of Xylene for 1/3 minutes to remove the fat and then in alcohol or alcohol-ether for 3 minutes to fix the preparation. The slide is stained with saturated aqueous methylene blue or withj thronine. The bacteria, the red corpuscles and other solid matter in the preparation are stained by this treatment, and in order to distinguish between bacteria and red corpuscles, the preparation is partially decolorized by pouring methyl alcohol over the slide until it is only faintly colored blue. The slide is then examined under an oil-immersion objective and the bacteria and red corpuscles in a number of fields are counted and the mean figures for each obtained. The number of red blood corpuscles in the dilute blood may be taken as 500,000 per cc. if the blood is taken from a healthy person, and thus the number of bacteria in the milk can be calculated. The degree of accuracy is sufficient for industrial use and nothing is gained by using more refined methods for preparing the blood solution.

D. V. ALBERTS

710. **Factors influencing percentage of fat in milk.** T. E. WOODWARD. *Dairy Sci.* 6, Sept. 466-478 (1923).

711. **Relation between percentage fat content and yield of milk, correction of milk yield for fat content.** W. L. GAINES and F. A. DAVIDSON. *Ill. Sta. Bul.* 245, June, pp. 577-621 (1923).

712. **Vitamin C content of dried milk.** GEORGE W. CAVANAUGH, R. ADAMS DUTCHER, and JAMES S. HALL. *Am. J. Diseases of Children*, June (1923).—Abstracted in *Am. J. Pub. Health* 13, 803 (1923), by Taliaferro Clark.—Owing to the increasing demand for a dependable substitute for fresh milk in many localities, a study was made of dried milk from the standpoint of nutritive qualities. The results seem to indicate that the spray process of drying milk preserves the vitamin C content in its original strength. C. O. BALL

713. **The endothermic reaction which accompanies the appearance of a visible curd in milks coagulated by heat; a contribution to the theory of the heat coagulation of milk.** ALAN LEIGHTON and C. S. MUDGE. *J. Biol. Chem.* 56, 53-73 (1923); through *C. A.* 17, 2429 (1923).—An endothermic chemical reaction accompanies the heat coagulation of milk, the reaction apparently being a precipitation of calcium and magnesium as citrates and phosphates in which the metals combined with the protein are also concerned. The thickening of condensed milk sometimes occurring during storage is the result of a chemical, not a bacteriological, reaction which can be prevented by a high forewarming at 110-120° and perhaps by a 30 min. forewarming at 95°. A preliminary 10 min. forewarming of evaporated milk at 95° stabilizes the prod-

uct; if done at 100°, the product is slightly unstabilized and, if done at 120°, it is decidedly unstabilized. Similar forewarming treatments of condensed milk give exactly opposite results. A prolonged forewarming of condensed milk at 95° first unstabilizes and then stabilizes the finished product as shown by heat absorption tests. Sugar exerts a very definite effect on the stability of condensed milk but there is yet insufficient data to warrant conclusions as to the nature of the reaction. L. and M. "feel justified in hazarding the opinion that the controlling factor which determines the stability of milks toward the action of heat is the equilibrium of the salts of milk, and that the effects of forewarming upon the stability of milk samples under further heating are the effects produced by altering this equilibrium. Since sucrose solutions dissolve calcium phosphate and citrate and can also form compounds with both calcium and phosphorous, it seems probable that the effect of cane sugar will also be explained by its action upon the equilibrium. Any denaturation or dehydration of the protein before precipitation is believed to be a secondary reaction." A. P. LOTHROP

714. **Studies in sweetened and unsweetened condensed milk.** WM. G. SAVAGE and R. F. HUNWICKE. *Food Investigation Board, London, Special Report* No. 13, 103 pp. (1923); through *C. A.* 17, 3061 (1923).—A chemical and bacteriological examination of canned sweetened condensed milk obtained from the factories and retail dealers in England and in the United States was conducted to determine the causes for spoilage of this product. After a very thorough investigation into the conditions affecting the processing and canning of sweetened condensed milk it is concluded that the chief sources of spoilage of this product are (a) type of yeast indicated as "A", which is spherical and produces gas in the canned product; and (b) slow ingress of air into the sealed tins through minute leaks. The chance for contamination of the processed milk at the factory is enhanced by the widespread idea among factory operators that the added cane sugar is sufficient in itself to protect against after fermentation. This idea was proved to be false in the study. Among the advocated preventions of unsoundness are the following: (1) Sufficient preheating of milk before condensation, (2) cooling of the condensed milk so as to avoid air contamination, (3) special attention to the sanitation of pipe lines each day (live steam or steam under pressure is not sufficient to reduce contamination), (4) immediate canning of the condensed and cooled product, (5) air-tightness of tin containers. *Unsweatened condensed milk (evaporated)*.—After a similar thorough examination of this manufactured product it was found that (a) non-sporing bacilli, and the more resistant types of micrcocci, were concerned with the spoiling of canned evaporated milk and (b) the admission of air through minute leaks in the tins, makes it possible for dormant forms to multiply and cause decomposition. To obviate these conditions in the factories better sanitary methods in the cleaning of the apparatus, and more thorough sterilization of the canned milk are recommended. Since it is very much easier to kill the bacteria in the raw milk than it is in the tins of evaporated product, the preheating of the milk should be most thoroughly accomplished by holding near the boiling point for at least ten minutes before evaporation. This report is far more extensive and important than this abstract indicates. H. F. ZOLLER

715. **Carbonic gas used in keeping butter.** *Pacific Bottler* 43, 16 (1923).—The butter manufacturers of Holland have found that carbon dioxide (car-

bonic gas) will keep butter shipped to other countries pure and wholesome even for a considerable period after being exposed to air. The new process consists in churning in an atmosphere of pure carbon dioxide. The air is sucked out of the churn and is replaced by carbon dioxide, which fills the pores of the butter and keeps out the oxygen so long as the butter is not vigorously agitated after exposure to the air. The natural process of deterioration is accelerated by the oxygen and any temperature above the point where the butter fat would congeal and close up the minute spaces where the oxygen could penetrate and produce reactions. ERNEST H. WIEGAND

MISCELLANEOUS PRODUCTS

716. Suggestions in packing of high grade catsup. C. H. CAMPBELL. *Canner*, Sept. 8, p. 29 (1923).—Brief statements are given as to factory practice, equipment and seasoning necessary in packing high grade catsup.

J. E. MCCONKIE

717. Care as to details of catsup manufacture. H. W. PEARSON. *Canner*, Apr. 14, p. 33 (1923).—Details of successful catsup manufacture are discussed. These include production of the stock and harvesting at the proper time, abundant supply of good water for washing purposes, inspection and sorting of the stock before passing to the cyclones, adjustment, arrangement and sterilization of cyclones, beaters, and evaporators, control of specific gravity and consistency of the finished product. J. E. MCCONKIE

718. Furfural from corncobs. FREDERICH B. LAFORGE and GERALD H. MAINS. *Ind. Eng. Chem.* 15, 823-829 (1923).—The work of the Bureau of Chemistry in the production of furfural from corncobs, and the experimental plant and process developed in the course of the work are described. The plant consists essentially of a pressure digester unit and a continuous still. The cobs are digested with water and high pressure steam, the vapors being condensed to form a dilute furfural solution which is concentrated in the column still. Optimum operating conditions are: pressure 130-135 pounds (180° C.); ratio of water to cobs 4:1; digestion period 2 hours. The furfural yield obtained is 6% of the weight of cobs used. The column still separates from the dilute solution 5-6 pounds of crude (95%) furfural per hour with a 97-98% recovery. Small quantities of acetic acid, acetaldehyde, and methanol are by-products. The process is simple and commercially feasible and can be adapted to a number of agricultural wastes. P. J. DONK

719. Mayonnaise reports issued by cooperative research committee. *Am. Vinegar Ind.* Oct., p. 15 (1923).—Mayonnaise is a stable emulsion of oil in the water derived from the yolk of egg and from vinegar. The emulsifying agent is the protein in the yolk of egg. Factors involved in producing an emulsion are physical properties of substances used, proportions of ingredients, and manner of beating or shaking. In summarizing the work so far, it appears that if the proportion of unemulsified oil to that of the emulsion which exists at the moment is kept below a certain maximum, a stable emulsion is always formed. If the oil is added slowly enough a successful dressing is produced no matter what the other conditions may be. The work is being continued. ERNEST H. WIEGAND

720. Suggestions for making better pickles. LEES BALLINGER. *Canner*, Aug. 25, p. 31 (1923).—The importance of soil, seed, planting, cultivation, inspection, prompt salting and submerging of the cucumbers and control of the

lactic acid content of the brine is emphasized. Open air tanks aid in keeping the brine free of scum yeast, and the pickles in sounder condition.
J. E. McConkie

721. **Grades of kraut.** National Kraut Packers Association. *Canner*, May 12, p. 40(1923).—The necessity of a system of grading kraut is amply shown by the results of scoring a number of samples from various packers on flavor, cut, color, crispness and fill. J. E. McConkie

722. **Grading sauerkraut.** Roy Irons. *Trade*, May 14, pp. 22-4(1923).—There is as much difference in the quality of sauerkraut as there is in other food products. This is made evident by the results of a grading "bee" on 34 samples. In percentage, the grades given ranged from 44-1/7 to 95-1/7. The points covered were flavor, cut, color, crispness, and fill. C. O. Ball

723. **Sauerkraut standards.** *Canner*, Sept. 1, p. 42(1923).—The committee on grades appointed by the National Kraut Packer's Association suggests that tests be made as to the reliability of lactic acid content determinations as a basis for grading sauerkraut. J. E. McConkie

724. **Jellying of sorghum sirup.** Sidney F. Sherwood. *Ind. Eng. Chem.* **15**, 780-782(1923).—Starch seems to be largely responsible for the jellying of sorghum sirup and for the extreme difficulty in filtering sorghum juice, especially after it has been heated. Preliminary treatment of the juice with malt diastase greatly increases the rate of filtration and prevents the "jellying" of the finished sirup. P. J. Donk

725. **The chemistry of some vinegar containing products.** R. O. Brooks. *Am. Vinegar Ind.*, Sept., p. 5(1923).—Soy sauce is a dark-brown salty liquid made by the fermentation of soy beans with some additional starchy component. The manufacture begins with the preparation of the ingredients and includes a preliminary mold fermentation, followed by a ripening in brine. The mold-fermented material is emptied into the strong brine, thus producing a mash. Constant daily attention is given to aeration, even distribution and stirring of the solid ingredients. The rather thick, dark-brown mash resulting is siphoned or pressed to produce the soy sauce, which is brought to a boil, filtered, and partially pasteurized. The completed sauce is distributed in casks or bottles. Ernest H. Wiegand

726. **How to treat a case of eels.** *Am. Vinegar Ind.*, Sept. p. 20(1923).—Cleanliness in the vinegar plant is very important. Eels may be removed from the vinegar itself by filtration, as the eggs and larvae and all forms of the eel are too large to pass fine filters. Coarse filter paper may be used for this or sand put in a receptacle with a cloth or other porous bottom. It is easy to test the filters by saving some filtered vinegar for a few days, when the eels will make their appearance if it is still eel-infested.
Ernest H. Wiegand

727. **Making high grade vinegar.** W. W. Chenoweth. *Am. Fruit Grower*, Oct., p. 4(1923).—Fresh cider should be placed in clean sterilized kegs or barrels, which should be filled practically full. The casks should then be laid on their sides in a room of temperature about 75 to 85° F. In order to control the type of fermentation, a culture of two or three cakes of baker's yeast in a small quantity of warm water to each barrel should be used. Six weeks should be allowed for fermentation. When fermentation has been completed, the hard cider should be transferred to a clean cask. These casks should be filled only about three-fourths full. Acetic fermentation will be

completed in two to four months. When vinegar tests around 5% acetic acid or above, it should be drawn from the casks, filled into clean tight casks, bunged and placed in a cool place for 6 to 12 months to ripen.

ERNEST H. WIEGAND

728. Vinegar analysis for canners. W. V. CRUESS. *Canner*, Aug. 11, p. 44 (1923).—Two simple methods for the determination of acid content in vinegar are given. In the Leo tester method, a slight excess of sodium bi-carbonate is added to a measured volume of vinegar and the CO_2 liberated is measured in a gas burette calibrated to read in grains. The apparatus is obtainable from chemical supply houses. The second method is the more accurate, and consists in titration of a measured sample of vinegar with standard sodium hydroxide solution using phenolphthalein as an indicator. A 10 cc. sample of vinegar is diluted with 50 cc. of distilled water and normal sodium hydroxide added from a burette. The end-point is reached when one drop of sodium hydroxide turns the solution red.

J. E. MCCONKIE

729. Vinegar standards in Kansas. *Canner*, Apr. 14, p. 45 (1923).—Standards and labeling regulations for vinegar from dried and evaporated apple products are given.

730. Uniform vinegar law as proposed by one of the industry's leading representatives. J. H. KALTENBACH. *Am. Vinegar Ind.* 3, Sept., p. 15 (1923).—The trouble with most of the laws is that they endeavor to go into so many details that it makes confusion possible. This law is based on the Michigan law with slight alterations. The term "vinegar" as used shall be applied only to the product or a water dilution of such product derived by the alcoholic and subsequent acetous fermentation solely of fruits, grains, vegetables, sirups or sugars. The vinegar resulting from the use of such alcoholic ferments must carry in suspension the extracted matter derived solely from the substance indicated on the label as its source. It shall be permissible to distill alcoholic ferments derived as indicated and use the resulting distillate for conversion into vinegar and to reduce the strength of resulting vinegar by dilution with water. Such product shall be known as "distilled vinegar" and a statement of the substances used in its production shall be given. No vinegar shall be sold or exposed for sale as cider vinegar which is not the legitimate product of pure apple juice, and the term cider vinegar shall be applied only and shall be construed to mean vinegar derived by the alcoholic and subsequent acetous fermentation of the expressed juice of fresh apples, the acidity, solids and ash of which cider vinegar have been derived exclusively from apples. All vinegar shall have an acetic acid content of at least 4%.

ERNEST H. WIEGAND

731. Lye peeling of raw products for canning. W. V. CRUESS. *Canner*, May 12, p. 27 (1923).—Soda lye and soda ash are the two compounds in general use for lye peeling. It is of importance that the canner know the strength of the lye solution being used and also the per cent of active ingredients in the commercial product which he buys and this is best determined by a simple titration with standard hydrochloric acid. Several forms of lye peeling machines are described. In order to obtain uniformity and rapidity in peeling, the lye solution is kept constantly at the boiling point and the length of immersion and concentration of the solution varied with the type of peeler and the kind and maturity of the product. Blanching is a desirable process to follow lye peeling as it tends to prevent oxidation and browning of the surface. Lye peeling is especially suitable for fruits such as peaches, and it is also used for peeling carrots, parsnips, hominy, sweet potatoes and tomatoes. Lye peeled products contain no lye, because the small amount of lye remaining after washing is neutralized by the natural acid of the product. Products like hominy require more careful washing, due to lack of this acid. Lye peeling reduces the cost of peeling, permits more rapid handling of the product, and causes less loss by peeling. The process depends upon the solubility of the middle layer of cells in hot dilute alkali, while both the epidermal layer and the lower cells are unaffected unless the lye treatment is continued too long. J. E. McConkie

FOOD ANALYSIS AND NUTRITION

(*See also numbers 656, 676, 678, 684, 704, 708, 712 and 728*)

732. **Amount of arsenic in must and grape wines resulting from treatment of the vines with arsenical sprays.** C. Von der Heide. *Wein u. Rebe.* 3, 515-528, 595-596(1922); *Chem. Zentr.* 94, *II*, 344-345(1923); *J. Soc. Chem. Ind.* 42, 285A(1923).—Gathered grapes, pressed must, pressed marc, new wine yeast, marc wine and marc wine yeast were tested for arsenic after the vines had been subjected to treatment with lead arsenate (zabulon), calcium arsenate (Sturm's material), and copper aceto-arsenite (Schweinfurth's material). Arsenic was found in all the samples whether it had been applied to the vines or not. More arsenic was found where the vines were treated with copper aceto-arsenite than with those that were treated with lead arsenate. None of the wines contained an amount of arsenic that would be harmful. The wine yeasts however contained as much as .185 mg. of arsenic per kilo. of dry matter which is enough to be harmful. D. V. Alberts

733. **Starch in sorghum juice.** Sidney F. Sherwood. *Ind. Eng. Chem.* 15, 727-728(1923).—The starch sucrose and reducing sugars content of the expressed juice of 15 varieties of sorghum at time of maturity are given. The probable effect of starch upon filtration of the juice, consistency of sirup and crystallization of sucrose is briefly mentioned. P. J. Donk

734. **Influence of copper on lactic fermentation.** M. Fouassier. *Compt. Rend.* 176, 606-608(1923); *J. Soc. Chem. Ind.* 42, 371A(1923).—Copper retards lactic fermentation while iron increases the rapidity of the action. The action is not influenced by other metals. D.V. Alberts

735. **The destruction of organic matter and the colorimetric determination of small quantities of metals.** K. K. Jarvinen. *Z. Nahr. Genuss.* 45, 183-90 (1923).—The author calls attention to the wide variety of methods for the destruction of organic matter and sets forth the advantages of the wet oxidation by alternate treatment with nitric and sulfuric acids, especially where the loss of arsenic, antimony, zinc, etc. must be prevented. In the method suggested, sufficient samples to yield about 10 gm. of dry matter are placed in a 300 cc. Kjeldahl flask, made ammoniacal, and reduced to a volume of 30 cc. by gentle heating. About 50 cc. of concentrated nitric acid (Sp. G. 1.40) are now added drop by drop with gentle heating of the flask. Excessive foaming may be prevented by a blast of air or the addition of small amount of benzene. Nitric acid must be added until all the hydrochloric acid is oxidized as detected by a drop of silver nitrate held at the mouth of the flask. Twenty cc. of concentrated sulfuric acid are now added slowly and

the heating continued until the solution just begins to char and blacken. More nitric acid is added and heating continued until the solution is decolorized. The temperature is increased with further additions of nitric acid if necessary until the solution remains colorless on strong heating. Considerable quantities of carbonized matter must not be allowed to form under the action of the sulfuric acid. The colorless solution is cooled, 70 cc. of water added, and boiled to remove oxides of nitrogen. One gram of sodium thiosulphate is added and the solution heated until the sulfur is oxidized. Finally the excess of sulfuric acid is removed by strong heating until the volume is reduced to 5 cc. Fifty cc. of water and 2 cc. of nitric acid are added and the solution is ready for analysis. This procedure leaves the arsenic and antimony in the trivalent and the tin in the tetravalent state. Experiments carried out on this oxidation in the presence of large quantities of salt and arsenic indicate that there is no loss of arsenic by volatilization. The method is not applicable where mercury must be determined and gives low results with copper. A colorimetric determination is advocated for very small amounts of metals. Many metals may be determined by a colorimetric comparison of their suspended sulfides precipitated by a freshly prepared 10 N. sodium sulfide solution. The precipitation is preferably done in a 50% alcohol solution since both sodium sulfide and hydrogen sulfide are more stable in this solution than in water. The alcohol will likewise clarify an opalescent hydrogen sulfide solution. Methods are outlined for the colorimetric determination of zinc and lead in the same solution, copper and zinc in those cases where brass has entered a food product, aluminum, nickel, arsenic and antimony. The determinations, including the destruction of the organic matter require only from 2-4 hours and give an accuracy of 1/20. R. H. LUECK

736. The use of orange peel in marmalade. H. SERGER. *Am. Vinegar Ind.*, Oct., p. 19 (1923).—The use of pulp of orange peel, which is higher in nutritive value than the fruit itself, in the preparation of marmalade obviates the strong taste characteristic of the entire peel. An analysis of the pulp gives: water, 68.43%; dry matter, 31.66%; mineral matter, 1.46 %; nitrogenous material, 1·93%; ether extractives, 1.22%; crude fiber, 17.75%; nitrogen-free extract, 10.30%. ERNEST H. WIEGAND

737. Action of metals on fruit and vegetable products. MAX DONAUER. *Chem. Age*, 31, 427-8 (1923).—Two tables are given, one showing the acid content of various food products and the other showing the amount of metals which are absorbed from a 100 gallon kettle per 60 hour week. Also three graphs are given showing the amounts of metals absorbed by hot citric, malic and tartaric acid solutions of such strengths as are commonly found in fruits. The acids in food products do not act any differently than other acids in their corrosive action upon metals. While the gradual wearing away or pitting of a cooking kettle or other vessel has been frequently observed it has not generally been considered as indicating the absorption of metal by the food products. The work summarized in this paper has been done with the idea of determining the amount of various metals absorbed by fruit acids and fruit products. Such figures show the relative effects on different metals used in contact with acid foods. It also shows that metals are absorbed by such foods, processed in metallic containers. The amount of metallic contamination may be kept to a minimum by avoiding metallic contact wherever possible. The proportion of metal absorbed may seem insignificant and yet it may influence the quality of the food produced. Metallic salts, with the possible exception of tin, have a strong taste and it takes but a few parts per million to give a decided flavor which may overshadow delicate fruit flavors. Frequently metals change or practically destroy the brilliant color of the fruit juice or other food products. In canned food the presence of a metal such as copper may cause a dark discoloration to form on the inside of the container. Just how far reaching the effects of the presence of small amounts of the more active metals may be on the food is difficult to determine, but from the general tendencies which have been noted it is quite logical to assume that the life of the food in the packages may be affected considerably by their action. At any rate, the information which is available is sufficient to assure the food product manufacturer that any steps taken to avoid absorption of metal in the processing of his food will be well worth the efforts expended. W. W. MURRAY

738. **The fruit-preserve industry in the Piedmont.** C. ZAY. *Staz. sper. agrar. ital.* 55, 129-35(1922); through *C. A.* 17, 3064(1923).—Analyses show the water, total dry extract, acidity, reducing sugars, sucrose, non-saccharine extract, protein, ash, alkalinity of ash and the water insoluble matter in preserves, jams and jellies of peaches, currants, plums, grapes, apricots, quinces, cherries and apples. ALBERT R. MERZ

739. **Pipette for lactose determination in milk.** E. G. MAHIN. *Ind. Eng. Chem.* 15, 943(1923).—Description of a special pipette for measuring milk in determining lactose by the polariscope.

740. **Detection of hypochlorites and chloramines in milk and cream.** P. RUPP. *Am. J. Pharm.* 95, 49-50(1923); *Analyst* 48, 178(1923).—Owing to the extended use of the chlorine compounds for disinfecting utensils in dairy work their intentional or accidental occurrence in milk is not unlikely. The detection of the available chlorine in the compounds when added to milk presents difficulties owing to the combination of the chlorine with the proteins. The following method is therefore suggested: 5 cc. of the sample are shaken with 1.5 cc. of a freshly prepared 7.0% solution of potassium iodide and the color noted. If there is no perceptible change 4 cc. of dilute hydrochloric acid (1-2) are added and the curd thoroughly stirred with a glass rod flattened at the end, the color again noted, and the tube placed for 10 minutes in water maintained at 85° C., after which it is rapidly cooled in water and the color again noted. Finally 0.5-1.0 cc. of starch solution (1.0 gm. in 100 cc.) is added and the color reaction observed. Milk containing 1 part available chlorine in 1000 acquires a distinct reddish tint and at a dilution of 1 part in 2500, is still slightly colored as compared with a control sample. With 1-5000 of milk the mixture becomes pale yellow; on the addition of the potassium iodide solution. When heat is applied 1-50,000 can be detected. Milk which has been kept for 48 hours in an ice box still gives the reaction, but if it has been kept at the ordinary room temperature, the test is less sensitive. Milk pasteurized at 145° F. reacts like raw milk, as does 20% cream. It is best to examine both curd and the liquid below it.

F. J. DASHNER

741. **Canadian association of official analysts.** *Chem Age* 31, 299(1923).—Pursuant to a call of the Canadian Department of Agriculture to discuss and decide upon methods of analysis which would be regarded as official in the examination and control of feeding stuffs and fertilizers throughout the Do-

minion, Canadian chemists appointed as official analysts under the Feeding Stuffs and Fertilizer Acts met at Ottawa on June 5th and 6th. At the close of the conference, of which Dr. Frank T. Shutt, Dominion Chemist, was Chairman and George E. Grattan, Secretary, the Canadian Association of Official Analysts was organized. This new body of chemists will function along the same lines in Canada as does the Association of Official Agricultural Chemists in the United States. A list of the official analysts in attendance is given.

742. **The relation between growth-promoting and antirachitic functions of certain substances.** H. GLODBLATT and S. S. ZILVA. *Lancet* 205, 1647 (1923).—Studies of the effect of heat on the growth-promoting and antirachitic principles in cod liver oil show that they are destroyed at different rates when the oil is heated in the presence of air, and so support the contention of McCollum and others that these principles are different. Fresh spinach was found to be rich in the growth-promoting principle but relatively deficient in power to protect against rickets. H. M. LOOMIS

743. **The uses of carbon dioxide. I. Methods of manufacture and marketing. Uses in food products and industry. Low temperature applications.** C. L. JONES. *Can. Chem. Met.* 7, 172-4(1923).—A review of the manufacture, marketing, uses in food products, and low temperature application of carbon dioxide is given. A suggestion that foods be canned in carbon dioxide rather than by the vacuum process is made. The strength of the package need not be so great, and oxidation is eliminated. Experiments also show that carbon dioxide will protect the vitamins from oxidation. P. R. WILSON

744. **Food preservatives.** *Analyst* 48, 216(1923).—In reply to questionnaire sent by Dr. R. Dudfield medical officer of health in Paddington, to medical officers of health in different parts of England, replies from 109 areas have been received. The information has been summarized in a report of the Paddington Public Health Court, and the following table shows the widespread use of preservatives, their varied character, and the extraordinary ranges in the quantities added by different manufacturers:

		Quantities of Preservatives	
Commodity	Preservatives	Max. grains per lb.	Min. grains per lb.
Bacon	Boric acid	35.0	2.0
Dried fruit	Sulfur dioxide	15.2	1.4
Jam	Salicylic acid	10.0	.07
Margarine	Boric acid	175.0	Trace
Fish pastes	Boric acid	105.0	Trace
Vegetables	Copper sulfate	10.2	Trace
Lemon squash	Salicylic acid	13.1	.06

F. J. DASHNER

745. **Nutrition studies of some new varieties of citrus fruits and avocados.** M. E. JAFFA. *Calif. Avocado Assoc. Ann. Rept.* 1921-1922, 58-64; *Expt. Sta. Record* 48, 159; through *C. A.* 17, 2621(1923).—Proximate analyses are reported of the tangelo, a hybrid produced between the pomelo and the tangerine; the orange-lemon hybrid; and the citrange, a hybrid between a common sweet orange and the trifoliate orange. These analyses show that the acid content of the tangelo approaches that of the grapefruit, and that the

percentage of sugar is only slightly higher than that of the grapefruit. In the orange-lemon hybrid the acidity and sugar content correspond to that found in the lemon, while the physical characteristics resemble those of the orange. The citrange in its content of sugar and acid is halfway between a lemon and an orange.

H. GILMAN

746. **Biological food tests III. Changes in vitamins A and B of the globe artichoke due to various canning and drying processes.** A. F. MORGAN and H. D. STEPHENSON. *Am. J. Physiol.* 65, 49(1923).—The proximate composition of edible portion of globe artichoke, boiled and dried at 70° C., is given. A study was made of the vitamin content of this vegetable and of the relative effect of drying, cooking and canning on vitamins present. The fractional sterilization method at atmospheric pressure and the pressure cooker process of canning used, are described. Freshly boiled artichokes, prepared by cooking the vegetables without added water in glass jars in a boiling water bath for 90 min. were found to be comparatively rich in vitamin A and showed a moderate amount of vitamin B. The effect of the fractional sterilization method used on vitamin A was approximately the same as that of the pressure method. The effect of the two methods on vitamin B indicated greater destruction by fractional sterilization, the artichokes canned by the pressure method showing about the same vitamin B content as the "freshly cooked" vegetable. The dried product proved to be high in vitamin A but is not a rich source of vitamin B. In this vegetable there seems to be little destruction of vitamin A by canning or drying but vitamin B was rather rapidly destroyed, long exposure to relatively low temperature having more destructive effect than shorter exposure to higher temperatures.

H. M. LOOMIS

747. **Biological food tests. I. Vitamin A in some citrus fruit products.** A. F. MORGAN. *Am. J. Physiol.* 64, 522-37(1923); through *C. A.* 17, 2730 (1923).—The products were judged (1) by their curative effects on rats and (2) by their effects on growth of rats, when the diet contained no other source of vitamin A. Two samples of orangepeel oil (obtained by ether extraction and by cold pressure) contained vitamin A in amounts not far different from that found in fresh commercial cod-liver oil. A sample of oil prepared by cold pressure fom Valencia oranges that had hung on the trees several weeks after reaching maturity was practically devoid of vitamin A, while a fourth sample obtained by steam distillation was also valueless. The vitamin content of the four oils was of the same order as their depth of color. Dried outer orange peel in doses of 0.5 to 1 gram (single dose) was effective in curing xerophthalmia; lemon peel was somewhat less effective. Orange juice, concentrated *in vacuo*, cured the typical eye disease brought on by vitamin A deficiency, in doses corresponding to 12 to 30 cc. of the fresh juice. Lemon oil and grapefruit peel were ineffective as a source of vitamin A. II. Vitamin A in skim milk. Ibid 538-46.—Five grams dried skim milk (spray-process product) daily was less effective as a source of vitamin A for young white rats than 0.25 grams butter fat. On this basis it is estimated that average whole milk should be more than eight times more concentrated in vitamin A than the skim milk separated from it.

J. F. LYMAN

748. **Vitamin content of honey.** A. SCHEUNERT, M. SCHUBLICH, and E. SCHWANEBECK. *Biochem. Z.* 139, 47-56(1923); *J. Soc. Chem. Ind.* 42, 904A

(1923).—From feeding experiments on rats, doves, and guinea pigs with three different sorts of honey, it is concluded that honey does not contain vitamins in quantities of any practical importance. D. V. ALBERTS

749. **Differentiation of vitamin A from the antirachitic factor.** E. LESNE and M. VAGLIANO. *Comp. Rend.* 177, 711(1923).—A diet which will produce rickets in young rats can be supplemented by feeding cod liver oil. If the cod liver oil be injected under the skin instead of being fed, the rats grow and gain weight but develop rachitic lesions. This is considered proof that fat-soluble A contains a growth factor and an antirachitic factor, the latter being effective only when ingested. LUTHUR THOMSON

750. **Study of the vitamins in mollusks. Concerning the antiscorbutic factor in oysters.** MME. RANDOIN. *Comp. Rend.* 177, 498(1923).—Guinea pigs, when fed on a diet free of vitamin C, develop scurvy and die in from 30-40 days. If 15 grams of fresh oysters be added daily to the ration, the pigs remain normal. LUTHER THOMPSON

751. **Vitamins.** *Am. J. Pub. Health* 13, 482-3(1923).

BACTERIOLOGY

(*See also number 709*)

752. **Bacterial spoilage of canned foods.** W. V. CRUESS. *Canner*, June 16, pp. 27-29, June 23, pp. 31-32(1923).—Spoilage is usually caused by living organisms, which are classified as yeasts, molds, and bacteria. Molds cause trouble in jellies, jams, and tomato products, and also spoilage in fresh fruit. Flat sours and swells in canned vegetables are caused by bacteria. Thermophilic bacteria are resistant to heat and cause spoilage when the product is not thoroughly cooled after it is sterilized. Most canned foods, even though sound, frequently contain living spore-bearing bacteria which do not develop because air is lacking in the can. B. S. CLARK

753. **Bacteriological studies of brine pickles.** OTTO RAHN. *Canner*, Sept. 22, p. 27(1923).—Many kinds of bacteria are present in the brine immediately after adding the cucumbers but most of these die out leaving only a few varieties which can thrive in the presence of salt. One type, which decomposes sugar into acid and gas, can multiply as soon as a little sugar enters the brine from the cucumber. This acid varies from .6 to 1.2% in well fermented tanks and its presence destroys nearly all bacteria in the brine. Invariably there is present a scum-yeast which thrives in the presence of air and acid and in time destroys the acid, after which the pickles soften and spoil. The keeping qualities of pickles can be improved by preventing the growth of scum-yeast by covering the brine with paraffin, or exposing to sunlight. Salt is necessary because it retards activities of all bacteria and also the acid-destruction by scum-yeast. Softening or spoiling of pickles is probably caused by the action of a so-called potato bacterium which feeds on the substances holding the cells of the pickle together. This bacterium cannot grow in the presence of acid and the greatest danger from it is during the first few days of fermentation before the acid content gets high enough to inhibit it. This danger may be minimized by bringing about quickly the acid fermentation and subsequently keeping the acid content as high as possible. Inoculation of a full tank with brine in which acid fermentation is already well advanced is an efficient means of accomplishing this.

J. E. MCCONKIE

754. **Two "food poisoning" outbreaks apparently due to bacilli of the paratyphoid-enteritidis group.** E. O. JORDAN and J. C. GEIGER. *J. Infectious Diseases* 32, 471-478 (1923).—A complete report of two outbreaks of gastroenteritis one which affected 52 students of Rockford College at Rockford, Illinois, on April 8, 1922, and one on the afternoon of September 27, 1922, affecting several hundred pupils of the Woodlawn High School at Birmingham, Alabama, is given. No fatalities occurred in either case. It was shown that the first outbreak was apparently due to a "cream sauce" that became contaminated with B. paratyphosus A from a human carrier (exact source unknown) through the milk supply. Two other outbreaks had occurred previously in substantially the same group of persons and similar cases are known to have occurred at about the same time among the patrons of a public restaurant in which milk from the incriminated dairy was used. The Birmingham outbreak was probably due to the specific B. paratyphosus B found in the meat used in sandwiches at the school lunch. It is supposed that the meat had been contaminated by a paratyphoid carrier and that favorable incubation conditions led to an enormous multiplication of these organisms in the sandwich with consequent toxin production. J. R. ESTY

755. **Poisoning by food probably due to contamination with certain bacteria.** J. C. GEIGER. *J. Am. Med. Assoc.* 81, 1275 (1923).—The author analyzes the data covering 749 outbreaks of alleged food poisoning based on personal investigation and records of Health Departments in 1922 and 599 cases based on the records of the National Canners Association during the period 1910 to 1921 inclusive. The latter group of cases is limited almost entirely to those alleged to have been due to commercially and home canned foods. The author calls attention to the fact that although a tendency is shown to incriminate commercially canned foods, such foods have advantages over other foods in that they are relatively free from human contact and sterilization of the food is based on scientific data, therefore contamination with paratyphoid bacteria is unlikely, though possible in leaky cans or after opening. No case of poisoning from tin has been reported in these investigations. The author recommends the term "ptomaine poisoning" be discarded as inconclusive and that clinical diagnosis of food poisoning should be supported by epidemiological, bacteriological and toxicological investigations. Procedure for investigation of such cases is outlined. H. M. LOOMIS

756. **Canned food poisoning.** K. K. JARVINEN. *Z. Nahr. Genuss.* 45, 191-2 (1923).—The author reviews two cases of food poisoning in Helsingfors resulting from the use of canned sardines containing 104 mg. of tin per 100 gm. of product. Since the sardines were sterile in every respect the author concludes that the tin was responsible for the ill effects upon the consumer. This led to a general investigation of the tin content of canned foods purchased in the Helsingfors markets. Much that was examined was at least 8 years old and the tin coating on the interior of the cans was badly corroded. In the old sardines the tin content varied from 72-80 mg. per 100 gm., in herring the average was 45 mg., spinach, 100 mg., and tomatoes, 68 mg. per 100 gm. Meat products, even those which were very old, ran lower in their tin content, averaging from 19-29 mg. per 100 gm. The author calls attention to previously reported cases from salts of tin in canned foods. R. H. LUECK

757. **Benzol poisoning.** JOHN F. HOGAN and J. H. SHRADER. *Am. J. Pub. Health* 13 279-282 (1923).

758. Botulism. *Am. J. Pub. Health* 13, 392-3(1923).—A review of the report of the California Commission on botulism, which is embodied in Public Health Bulletin No. 127, Treasury Dept. U. S. Public Health Service.

759. Experiments with bacillus (clostridium) botulinus under household conditions. RUTH E. EDMONDSON, CHARLES THOM, and L. T. GILTNER. *Am. Food J.*, Mar. (1923). Abstracted in *Am. J. Pub. Health* 13, 800(1923), by C. L. Alsberg.—For the purpose of determining what danger, if any, is liable to follow the common household practice of saving food of a perishable nature, samples of a variety of foods were inoculated with pure cultures of bacillus botulinus and with mixed cultures of this organism with the common yeast. The inoculated food materials were then kept for varying periods at different temperatures under conditions which might easily obtain in the household. At intervals portions of the materials were tested for toxicity by injection into guinea pigs. In general, the experiments indicate that food held in a reasonably efficient ice-box for from one to two days is practically free from development of B. botulinus, even if present, and is entirely safe for ordinary re-cooking. Further, food held to the third or even fourth day, if not showing physical signs of spoilage, such as mold, scum, souring or odor, involves little actual danger, but in every case calls for thorough re-cooking. The results equally clearly show the need of some type of effective refrigerator or cooling device in all households. C. O. BALL

760. Effect of spices on growth of Clostridium botulinum. FREDA M. BACHMANN. *J. Infectious Diseases* 33, 236-239(1923).—Ground cloves, cinnamon, all-spice, nutmeg, black mustard, white mustard, cayenne pepper and ginger in amounts of 1, 2, and 2.5% in hamburger steak medium and inoculated with meat cultures of C. botulinum were found to be favorable mediums for growth and toxin production. No inhibition of growth was found in 1 and 2% of spices but growth was somewhat retarded in 2.5% amounts of allspice and cloves. Higher percentages were not used because even 2.5% is in excess of what would be used for flavoring foods. The use of the above spices does not help to make the food safe if C. botulinum is present. To insure safety, it is recommended that such foods as mince meat be sterilized or else heated to the boiling point before tasting them. J. R. ESTY

761. Toxin production and signs of spoilage in commercially canned vegetables and fruits inoculated with detoxified spores of B. botulinus XII. P. SCHOENHOLZ, J. R. ESTY and K. F. MEYER. *J. Infectious Diseases* 33, 289-327(1923).—This paper presents data to show that sterile canned food products artificially contaminated with detoxified spores of B. botulinus, but not processed after the inoculation, may present varying degrees of spoilage, and may contain the specific toxin, when incubated at 35° C. (95° F.) or at room temperature (60-70° F.) for at least one year. The canned foods are divided into three groups: (1) foods which exhibit marked physical and chemical changes and become regularly toxic, namely, corn, peas, salmon, sweet potatoes and pumpkin; (2) very acid products which rarely, if ever, show signs of botulinus spoilage, namely, sauerkraut, tomatoes, apricots, cherries, peaches, pears, plums, raspberries, strawberries and pineapple; and (3) certain vegetables which spoil and become toxic irregularly including a variety of food products such as asparagus, beets, ripe olives, spinach, pimentoes, green peppers, string beans and evaporated milk. The products of this last group may be highly poisonous but present little or no visible sign of spoilage. There

is believed to be no danger of botulism from commercially canned fruits unless the raw product contains bruised or rotting portions which are canned. Certain recommendations are given regarding the handling of the raw products, preparing them for canning and the procedures other than adequate sterilization which will safeguard against botulism. These are briefly summarized under five headings: sanitation, processing, coding, incubation, and storage. The summary and conclusions based upon a systematic bacteriologic and toxicologic study of 346 cans of commercially packed food products of both plant and animal origin are as follows: corn, peas, salmon, sweet potatoes, and pumpkin undergo spoilage regularly after relatively short periods of incubation, the decomposed products are very toxic. Spoilage and toxin production in asparagus and beets are irregular, and growth at room temperature is frequently retarded. The cans may remain flat, although the contents are spoiled and toxic. The toxin production of B. botulinus in asparagus and beets is not always accompanied by spoilage of sufficient intensity to warn the consumer. Toxin production, irrespective of the suitable reaction, is irregular in sound, unbroken ripe "mission" olives. Potent toxins are rarely obtained in experimentally infected cans. Red and green peppers (pimientos) rarely exhibit visible signs of spoilage. The contents of the abnormal containers is weakly toxic. The multiplication of B. botulinus in spinach is irregular and is not always accompanied by the evolution of gas. In a series of 24 cans, five (4 No. 2½ and 1 No. 10) cans with toxic contents remained flat. Even after an incubation at 35° C. for 5½ months and at room temperature for 12 months, the toxic spinach was judged to be normal in appearance and odor. Spoiled and toxic spinach may give off a sour butyric acid, or sometimes a cheesy odor. Growth of B. botulinus is irregular in string beans. Bulging of the cans occurs in about 50% of the inoculated tins, but spoilage of the contents is rare. Toxins are frequently found in cans which have a normal odor and present firm pods of a natural color. Spoilage and toxin production are irregular in evaporated milk. The toxins once formed may deteriorate on prolonged incubation. The available evidence indicates that spores of B. botulinus cannot grow in sweetened condensed milk. Moderate toxin production in acid fruits and vegetables, as for example apricots, cherries, peaches, plums, raspberries, strawberries, tomatoes, and sauerkraut, may occur after prolonged incubation, and then in exceptional instances only.
J. R. Esty

762. **Studies on serologic classification of B. botulinus. I. Preparation of antiserum.** P. E. Schoenholz and K. F. Meyer. *J. Infectious Diseases* 32, 417-420(1923).—B. botulinus antiserum of high titer 1:4,000 to 1:10,000 has been produced by the intravenous inoculation of washed and heated cultures according to the method of Tulloch for the production of tetanus antiserum. Of 69 rabbits immunized with various strains of B. botulins, 45 responded satisfactorily, 8 responded poorly and 15 gave negative results. By means of serologic tests, B. botulinus, type A can be differentiated from type B and by means of agglutinin and agglutinin-absorption tests the A types can be subdivided into at least 3 and possibly 4 groups while the B types can be divided into at least 2 groups.
J. R. Esty

763. **Germination of spores of B. botulinus in collodian sacs in abdomen of guinea pigs and rabbits.** George E. Coleman. *J. Infectious Diseases* 33, 384-390(1923).—Heated spores of B. botulinus germinate freely with the pro-

duction of potent toxins when enclosed in collodian sacs introduced into the abdomen of guinea pigs and rabbits. The toxin of B. botulinus does not dialyze in vitro nor does the toxin produced in sacs dialyze into the body fluids of guinea pigs and rabbits. (Abstractors note:—These results and those previously reported conclusively show that spores of B. botulinus can germinate in the animal body. Special emphasis is placed upon the necessity for discarding spoiled foods. Recent studies have shown that certain foods may contain potent toxins of B. botulinus without presenting any visible evidence of spoilage. In such cases as well as with visibly spoiled food it is safe to assume that enormous numbers of spores may have been produced. Heating such material for a sufficient time to destroy the toxin and not the spores does not render it absolutely safe since the ingestion of enormous numbers of detoxified spores may produce botulism. The destruction of all suspected material then is indeed justified and strongly recommended. The question of utmost consideration is the determination of safe processes for all canned foods in which these spores can grow). J. R. Esty

764. **Effect of acidification on toxicity of B. botulinus toxin.** J. C. Geiger and W. E. Gouwens. *Public Health Reports* 38, No. 39, Sept. 28(1923).—Toxins of four strains of B. botulinus were not increased in potency at any hydrogen ion concentration, regardless of the length of time of exposure. The acid mixtures employed in this study were hydrochloric acid—sodium citrate and acetic acid—sodium acetate mixtures. The injection of 1 cc. of a buffered acetic acid of pH 4.0 causes the death of mice. This occurs whether B. botulinus toxin is present or absent. With greater concentration of the hydrogen ions, death is more rapid, and less than 1 cc. is sufficient to cause death in 24 hours. Hydrochloric acid—sodium citrate, hydrochloric acid—potassium acid phthalate and lactic acid—calcium lactate mixtures between the limits pH 4.0 and 2.3 do not kill white mice when injected intraperitoneally in 1 cc. amounts. The acetic acid appears to have a selective action on white mice. This is not due to the acetate ions of undissociated sodium acetate molecules alone. P. L. Gowen

765. **Clostridium botulinum resistance of spores to moist heat.** Fred W. Tanner and Forest D. McCrea. *J. Bact.* 8, 269(1923); abstracted in *Am. J. Pub. Health* 13, 693(1923), by C. C. Young.—At 100° C. the spores of clostridium botulinum in sealed tubes exhausted to 17 mm. were killed within 5 hours; at 105° C. within 2 hours; at 110° C. within 1½ hours; at 115° C. within 40 minutes, and at 120° C. within 10 minutes. Spores of the same age but in open tubes required a longer period of heating to destroy than those in the sealed and exhausted tubes. The authors support the contention of Weiss that the destruction of the spores is a gradual process. Surviving spores have their inner structure so impaired that they are capable of producing only weak toxins. C.O. Ball

766. **Studies on the thermal death time of spores of Clostridium botulinum. Dormancy or slow germination of spores under optimum growth conditions.** Georgina S. Burke. *J. Infectious Diseases* 33, 274-284(1923).—This paper is a discussion of the factors which influence the germination of individual spores of C. botulinum. The results obtained upon the length of dormancy of individual unheated spores show that they are capable of lying dormant under favorable growth conditions for at least 92 days in agar and 144 days in broth. Approximately 2% of the spores developed after the first

month of incubation. The maximum germination times to date for heated spores for three types of media, are as follows: 201 days for spores heated and incubated in sealed tubes of agar; 214 days for spores heated and incubated in sealed tubes of broth without oil; 426 days for spores heated and incubated in sealed tubes of oil-stratified broth. Indications are that the limit of possible dormacy for the species has not been reached. It is concluded that dormancy and heat resistance are dependent on the same primary factor in the unheated spore and it is suggested that the relative permeability of the spore wall is probably one factor coupled with environmental conditions. The heat injury hypothesis is unwarranted since all the known facts can be accounted for on the basis of normal dormancy. Spores germinating after long periods of dormancy exhibit typical characteristics, and potent toxins of specific type are produced. Fractional sterilization at 100° C. for one hour or less on three successive days does not sterilize material contaminated with these organisms because of this peculiar character or dormancy. No conclusions can be drawn from negative spore cultures until the limits of dormancy for the given species are established.

J. R. Esty

LAWS, REGULATIONS AND STANDARDS

(*See also numbers 619, 620, 640, 643, 687, 723, 729 and 730*)

767. **Mustard standards.** *Canner*, Aug. 18, p. 43(1923).—Government definitions and standards for mustard meal, mustard cake, mustard flour, and prepared mustard are given. J. E. McConkie

768. **Canadian food standards.** C. C. McGillivray. *Trade*, Apr. 30, pp. 16-20(1923); *Canner*, Apr. 21, p. 32(1923).—The establishment of standards benefits farmer, canner, broker, jobber, wholesaler, retailer and consumer. The grower soon learns that it is more profitable to market peas at $120 to $140 per ton than to market them for $35 to $40 per ton a couple of days later. The grower and the canner alike soon learn that every hour that elapses between picking and canning has a decidedly detrimental effect upon the quality of the finished product. Wilted peas which will pass through a No. 2 sieve when raw will process to a No. 3 size. By the Canadian standards, the grading of peas for size is according to the size of the opening in the sieves through which the peas may be passed. These are: for No. 1 peas, 9/32 of an inch; for No. 2, 10/32; for No. 3, 11/32; and for No. 4, all above 11/32. Peas not graded for size must be marked "ungraded." For quality, the grades are fancy, choice, standard, and second. The quality must be marked on the label in letters not less than ⅜ of an inch high, and the size number in letters not less than ¼ of an inch high. Grading for size alone is inadequate, because the more mature the peas, the more they swell upon processing. Standard 1s, choice 2s, and fancy 3s come from the can the same size. To grade peas properly, one must know certain characteristics of the different varieties of peas, the soil conditions under which they are grown, and the climatic conditions during the period of harvesting. For instance, the Advancer has generally 7 peas in the pod, and when in prime conditions for canning, the pod shows; first day, 1 fancy 4, 2 fancy 3s, 2 fancy 2s and 2 fancy 1s; second day under favorable weather conditions—1 choice 4, 2 fancy 4s, 2 fancy 3s, and 2 fancy 2s; third day, 3 standard 4s, 2 choice 3s, and 2 fancy 3s; fourth day, 7 standard 4s or 4 standard 4s and 3 second 4s. The difficulties

accompanying grading are increased by the fact that the pods on the vine do not mature evenly. C. O. BALL

769. **Canned foods specifications.** HENRY M. LOOMIS. *Canner*, Sept. 8, p. 23 (1923).—Canned foods specifications should cover size and type of can; description of quality or grade, which may include variety, size, color, flavor, maturity, and strength of brine or sirup. For the following products, types of containers other than those indicated are unsatisfactory:

Enameled cans	Charcoal plate Enameled cans	Parchment lined cans
Pumpkin	Red sour cherries	Dry pack shrimp
Squash	Strawberries	
Sardines	Raspberries	
	Loganberries	

Government and Association standards for peas and string beans are given in detail and a more general description of the grades now packed, of fruits, and sea foods. Drained weights of lima beans, wax beans, pitted cherries, unpitted cherries, razor clams, hardshell clams, peaches, pears, peas, sauerkraut, spinach, Swiss chard, beet tops, corn, oysters and shrimp are given for the various sizes of cans commonly packed. J. E. MCCONKIE

770. **Court decision affects trade marks on foods.** *Trade*, June 18, p. 24 (1923).—An important decision of the Court of Appeals of the District of Columbia affecting the use of canners' trade marks.

771. **Standardization.** DANA F. WARD. *Fishing Gazette* 40, Sept. 24 (1923).—A plea for standard names, graded products, uniform business practice and standard containers in the fishing industry.

772. **The canned foods label. What we may do to have it clearly reflect the contents of the container upon which it appears.** *Trade*, June 25, pp. 14-16 (1923).

773. **Canada's pure food regulations.** FELIX S. S. JOHNSON. *Trade*, May 7, p. 32 (1923).—All food products, whether naturally grown, manufactured, or processed in any form must be accompanied by a Pure Food Certificate. Goods exported to Canada must be accompanied by an invoice in duplicate containing information as to quantity of goods, description of goods, country of origin, market value, etc. C. O. BALL

774. **List of registered trade-marks of the canned food industry (Fortegnelse over indregistreite ordmerker i. hermetikkindustrien).** *Tidsskrift for Hermitikindustri* 9, No. 6-7, 102-115 (1923).—A complete list, alphabetically arranged, of the trade marks issued from 1885 to 1912 inclusive. Those issued from 1913 to 1923 will be given at a later date.

775. **Destroying bacteria in bottles.** DR. WAITE. *Am. Vinegar Ind.* Oct., p. 13 (1923).—Solutions which are ordinarily used in the bottle soaker do not destroy all bacteria. The solution must be strong enough and heated to about 160°, and the bottles kept therein a much longer time than is ordinarily employed. If the bottles could be sterilized before the product is put in them, it would remove much of the bottlers' trouble. The sterilizing of the bottle would have no effect upon the products. Sterile crowns should be put on them, and bottles kept sterile while putting crowns on.

ERNEST H. WIEGAND

776. Lacquers which resist the action of weak acid solutions. *Andes. Farben Atg.* 28, 1260-1(1923); through *C. A.* 17, 2648(1923).—Chinese and Japanese lacquers, bakelite, shellac, etc., did not give as satisfactory acid-resistant coatings, as a black baking japan made from gilsonite, linseed oil and tar.
F. A. WERTZ

777. Estimate of canning cost in the South. *Canner,* Aug. 11, p. 31 (1923).—Detailed statistics showing the estimated cost of packing the following products in the south are given; sweet potatoes, sauerkraut, string green beans, blackberries, tomatoes, okra and tomatoes, beets, okra. Also the estimated capital necessary for packing these lines in the quantity indicated is given.
J. E. MCCONKIE

778. Foods and quackery. *J. Home Econ.* 7, 386(1923).—The Propaganda Department of the American Medical Association is collecting information on the nostrum evil and quackery, and publishing its findings in various booklets and publications. An example of its work is given in a chart on the food-iron content of the edible portion of 36 of the more common foodstuffs.
P. R. WILSON

779. Temperature inside the jar during cold pack processing. VIRGINIA BAUER. *J. Home. Econ.* 7, 381-382(1923).

780. The importance of a coding system for canned foods. F. E. GORRELL. *Trade,* May 7, p. 18(1923).—It should be possible for a canner to identify each can with the batch with which it was processed as well as with the output of a single line of canning machinery for a single day or for a part of a day. A system of coding which would enable a canner to do this would prove most invaluable to him in case of spoilage from any cause, of any illness attributed to his canned foods, of error in preparing a certain batch of food for canning, of error in stacking the cans in the warehouse, or of any complaint whatsoever regarding his product.
C. O. BALL

781. President Harding's illness not due to canned foods. *Am. Grocer,* Sept. 5, p. 9(1923).—Mr. F. E. Gorrell, Secretary of the N. C. A. wrote to Dr. C. E. Sawyer, Pres. Harding's personal physician, stating that it was the practice of the N. C. A. to investigate every illness attributed in any way to canned foods and that enormous sums of money have been spent in scientific research for the betterment of its product, and asked whether or not in his opinion President Harding's primary illness was caused from eating canned foods. Dr. Sawyer replied, "My answer is that Pres. Harding's primary illness was not due to eating canned foods." Dr. Cooper who was called upon on arrival at San Francisco also wrote, "I am in entire agreement with the opinion expressed by Dr. Sawyer and consider that Pres. Harding's illness was in no way due to his having eaten of canned food."
A. H. CARLE

782. Report and recommendations on credit for and destruction of spoiled canned goods. *Am. Grocer,* Aug. 29, pp. 5, 9-10(1923).

783. Warehousing plan would solve swells problem. *Canner,* Sept. 1, p. 26(1923).—A brief review is given of the injustice brought upon the canner by government regulations prohibiting the return of swells to the packer, as proof of claim allowance. These regulations will not accomplish the purpose for which they were intended, viz., the elimination of any possibility of swells being re-conditioned and sold for food. The warehousing plan, by which all swelled goods are sent to central warehouses, where claim allowances are handled by representatives of the canners in that zone, seems to be the logical solution to the problem, provided distributors, canners and food officials back the plan. Such a system would offer excellent opportunity for scientific study of canned food spoilage. J. E. McConkie

784. **Activated carbon—its evaluation, manufacture and uses.** Frederick Borinet, Jr. *Chem. Age* 31, 327-31 (1923).—For one who is engaged in sugar refining, candy and sirup manufacturing, refining edible oils and fats, gelatine, pharmaceutical products, organic acids like lactic, citric and tartaric, cream of tartar, baking powder, etc., this article will prove interesting reading. This paper was read and discussed at the Wilmington, Del., meeting of the American Institute of Chemical Engineers June 20, 1923. A reprint of the paper would be better than to attempt an abstract. W. W. Murray

785. **Swells and springers.** W. D. Bigelow. *Trade*, Aug. 27, p. 12 (1923).—A "swell" in canned foods is a can which has undergone decomposition by micro-organisms accompanied by the generation of gas, which first destroys the vacuum and then causes pressure in the can sufficient to bulge the ends. This decomposition is often of a putrefactive nature and may be either fast or slow. Swells are due either to under-sterilization or leaky cans. A "springer" is a can whose ends are bulged but in which the pressure is not sufficient to prevent pushing the ends back to their normal position. Springers may be due to the following causes: (1) pressure from hydrogen generated as a result of chemical action of the acid contents on the metal container; (2) imperfect closing of the can; (3) overfilling the can; (4) sealing at too low a temperature. In addition, springers may be caused by a change in the temperature of storage or by a change in altitude with the temperature remaining the same. Swells usually develop rapidly and springers slowly or not at all. Swells should never be used as food. The Federal and all State laws prohibit the sale of foods which in whole or in part are "filthy, decomposed or putrid." Springers due only to insufficient exhaust, overfilling or improper sealing are sound and edible. However, they should not be placed on the market in that condition, but should be treated to remove the bulged condition. This may be done by heating, venting, and re-sterilizing. Springers and even hydrogen swells due to action of fruit acids on the metal container are profoundly influenced by the temperature and time of storage. The designation of such products as decomposed is unscientific and untrue. It is unfair to the canner, for it implies carelessness or ignorance on his part and places responsibility on him, which is due to improper treatment after the product left his hands. R. M. Roberts

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